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# REQUEST FOR PROPOSAL

(FOR DESIGN/BUILD CONTRACT)

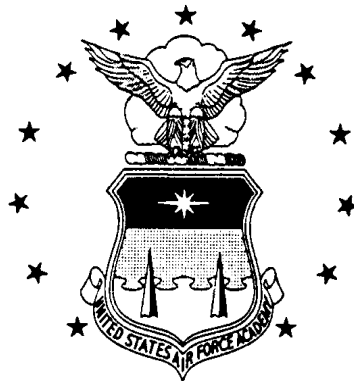
**SOLICITATION NO. DACA45-02-R-0012**

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## CONTROL TOWER

PN: XQPZ400500

U.S. AIR FORCE ACADEMY, Colorado



FEBRUARY 2002



U.S. Army Corps of Engineers  
Omaha District

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CONTROL TOWER  
PN: XQPZ400500  
USAF ACADEMY, COLORADO

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<b>SOLICITATION, OFFER, AND AWARD</b> (Construction, Alteration, or Repair)	1. SOLICITATION NO.	2. TYPE OF SOLICITATION	3. DATE ISSUED	PAGE OF PAGES
	DACA45-02-R-0012	<input type="checkbox"/> SEALED BID (IFB) <input checked="" type="checkbox"/> NEGOTIATED (RFP)	26 FEB 2002	1 OF 3

IMPORTANT - The "offer" section on the reverse must be fully completed by offeror.

4. CONTRACT NO.	5. REQUISITION/PURCHASE REQUEST NO.	6. PROJECT NO.
7. ISSUED BY	CODE	8. ADDRESS OFFER TO
	CT	
U S ARMY ENGINEER DISTRICT, OMAHA 106 South 15th Street Omaha, Nebraska 68102-1618		U.S.ARMY CORPS OF ENGINEERS, OMAHA Attn: CONTRACTING DIVISION (CENWO-CT) 106 South 15th Street Omaha, Nebraska 68102-1618
9. FOR INFORMATION CALL:	A. NAME	B. TELEPHONE NO. (Include area code) (NO COLLECT CALLS)
	See SECTION 00100, Para. 15	See SECTION 00100, Para. 15

#### SOLICITATION

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS (Title, identifying no., date):

The Offeror hereby agrees to do all the work described in these documents entitled:

CONTROL TOWER  
PN: XQPZ400500  
UNITED STATES AIR FORCE ACADEMY, COLORADO

RETURN WITH PROPOSAL: SECTIONS 00010 (SF1442), SECTION 00600: REPRESENTATIONS, CERTIFICATIONS & OTHER STATEMENTS OF OFFERORS, AND PROPOSAL SUBMISSION REQUIREMENTS IN SECTION 00110

OTHER BONDING INFORMATION: SEE SECTION 00700 CONTRACT CLAUSES CLAUSE "PERFORMANCE AND PAYMENT BONDS".

\* ITEM 13A: SEE SECTION 00110 FOR NUMBER OF COPIES

11. The Contractor shall begin performance within <u>10</u> calendar days and complete it within <u>440</u> calendar days after receiving	
<input type="checkbox"/> award, <input checked="" type="checkbox"/> notice to proceed. This performance period is <input checked="" type="checkbox"/> mandatory, <input type="checkbox"/> negotiable. (See _____.)	
12A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE AND PAYMENT BONDS? (If "YES," indicate within how many calendar days after award in Item 12B.)	12B. CALENDAR DAYS
<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	10

13. ADDITIONAL SOLICITATION REQUIREMENTS:

- A. Sealed offers in original and \* copies to perform the work required are due at the place specified in Item 8 by 1400 (hour) local time 26 MAR 2002 (date). If this is a sealed bid solicitation, offers must be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.
- B. An offer guarantee ☐ is, ☒ is not required.
- C. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.
- D. Offers providing less than 60 calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.

14. NAME AND ADDRESS OF OFFEROR (Include ZIP Code)  <div style="color: blue; font-weight: bold;">DUNS Number:</div>				15. TELEPHONE NO. (Include area code)  16. REMITTANCE ADDRESS (Include only if different than Item 14)			
CODE		FACILITY CODE					
17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within <u>60</u> calendar days after the date offers are due. (Insert any number equal to or greater than the minimum requirement stated in Item 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.)  <div style="display: flex; justify-content: space-between;"> <div style="width: 15%;"> <b>AMOUNTS</b> </div> <div style="width: 85%;"> <div style="color: blue;">See Attached PRICING SCHEDULE.</div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div>Contractor's Fax No. _____</div> <div>CAGE CODE _____</div> </div> <div>Contractor's E-Mail address _____</div> </div> </div>							
18. The offeror agrees to furnish any required performance and payment bonds.							
<b>19. ACKNOWLEDGMENT OF AMENDMENTS</b> (The offeror acknowledges receipt of amendments to the solicitation - give number and date of each)							
AMENDMENT NO.							
DATE							
20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or print)				20B. SIGNATURE		20C. OFFER DATE	
<b>AWARD (To be completed by Government)</b>							
21. ITEMS ACCEPTED:							
22. AMOUNT				23. ACCOUNTING AND APPROPRIATION DATA			
24. SUBMIT INVOICES TO ADDRESS SHOWN IN (4 copies unless otherwise specified)			ITEM <div style="color: blue; font-weight: bold;">26</div>	25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO  <input type="checkbox"/> 10 U.S.C. 2304(c) (     ) <input type="checkbox"/> 41 U.S.C. 253(c) (     )			
26. ADMINISTERED BY  <div style="color: blue;">U.S. Army Engineer District, Omaha 106 South 15th Street Omaha, Nebraska 68102-1618</div>			CODE	27. PAYMENT WILL BE MADE BY  <div style="color: blue;">USAED Omaha c/o USACE Finance Center 5722 Integrity Drive Millington, TN 38054-5005</div>			
<b>CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE</b>							
<input type="checkbox"/> <b>28. NEGOTIATED AGREEMENT</b> (contractor is required to sign this document and return _____ copies to issuing office.) Contractor agrees to furnish and deliver all items or perform all work, requisitions identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications incorporated by reference in or attached to this contract.				<input type="checkbox"/> <b>29. AWARD</b> (Contractor is not required to sign this document.) Your offer on this solicitation, is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.			
30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN (Type or print)				31A. NAME OF CONTRACTING OFFICER (Type or print)			
30B. SIGNATURE		30C. DATE		31B. UNITED STATES OF AMERICA  BY		31C. AWARD DATE	

**PRICING SCHEDULE**

<b><u>Item No.</u></b>	<b><u>Description</u></b>	<b><u>Quantity</u></b>	<b><u>Unit</u></b>	<b><u>Amount</u></b>
<b><u>BASIC ITEMS</u></b>				
1.	Entire Work Complete for Control Tower (construction cost only), Exclude Design Cost & Option listed below.	Job	L.S.	\$ _____
	Design Cost for Item No. 1.	Job	L.S.	\$ _____

**OPTION ITEMS**

O-1	Entire work complete for demolition of buildings 9212, 9229, 9232 and 9215. <i>Note: demolition of building 9205 is Basic Bid..</i>	Job	L.S.	\$ _____
-----	--	-----	------	----------

**GRAND TOTAL AMOUNT (BASIC + OPTIONS )  
FOR THE CONTROL TOWER**

\$ \_\_\_\_\_

**NOTES:**

1. See Section 00100, INSTRUCTIONS, CONDITIONS AND NOTICES OFFERORS, paragraph EVALUATION OF OPTIONS for evaluation of bid items and options. The Government reserves the right to exercise the Options within 90 calendar days after Notice to Proceed (NTP). Evaluation of Options will not obligate the Government to exercise the option(s).
2. Prices must be entered for all line items on the Pricing Schedule. Grand total amount price submitted without prices for individual line items will not be evaluated. Additions will be subject to verification by the Government. In case of variation between the lump-sum prices and the grand total amount, the lump-sum prices will be considered the price.
3. A modification to the Pricing Schedule, which provides for a single adjustment to the grand total amount will not be accepted. Modification to Pricing Schedule items, basic or options, should state the application of the adjustment to each respective lump-sum price affected. If the modification is not so apportioned the Pricing Schedule item will not be evaluated.

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SECTION 00100

INSTRUCTIONS, CONDITIONS AND NOTICES TO OFFERORS  
(July 2000, Revised November 2001)

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SECTION 00100

INSTRUCTIONS, CONDITIONS AND NOTICES TO OFFERORS

**1        DEFINITION OF "DESIGN-BUILD" PROCESS**

The "Design-Build Process is the procurement of a facility utilizing a Request for Proposal (RFP) to solicit for the design and construction of a facility by a single contractual entity. The contractual entity may be a "Design-Build" firm, or joint venture between an architect-engineer (A-E) and construction firm, or a construction management (CM) firm joint venture with an A-E and a construction firm.

**2        SOLICITATION RESTRICTIONS.**

**2.1     GENERAL CONTRACTOR.**

This solicitation is unrestricted (not limited to small business concerns).

**2.2     ESTIMATED DESIGN AND CONSTRUCTION COST.**

The estimated design and construction cost of this project is between \$5,000,000 and \$7,500,000.

**3        (FAR 52.217-5) EVALUATION OF OPTIONS (JUL 1990).**

Except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate offers for award purposes by adding the total price for all options to the total price for the basic requirement. Evaluation of options will not obligate the Government to exercise the option(s).

**4        (FAR 52.211-2) AVAILABILITY OF SPECIFICATIONS LISTED IN THE DOD INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) AND DESCRIPTIONS LISTED IN THE ACQUISITION MANAGEMENT SYSTEMS AND DATA REQUIREMENTS CONTROL LIST, DOD 5010.12-L (DEC 1999)**

Copies of specifications, standards, and data item descriptions cited in this solicitation may be obtained—

- (a) From the ASSIST database via the Internet at <http://assist.daps.mil>; or
- (b) By submitting a request to the—

Department of Defense Single Stock Point (DoDSSP)  
Building 4, Section D  
700 Robbins Avenue  
Philadelphia, PA 19111-5094

Telephone (215) 697-2667/2179  
Facsimile (215) 697-1462.

(End of provision)

**5 (FAR 52.215-1) INSTRUCTIONS TO OFFERORS--COMPETITIVE ACQUISITION (MAY 2001)**

(a) *Definitions.* As used in this provision--

"Discussions" are negotiations that occur after establishment of the competitive range that may, at the Contracting Officer's discretion, result in the offeror being allowed to revise its proposal.

"In writing," "writing," or "written" means any worded or numbered expression that can be read, reproduced, and later communicated, and includes electronically transmitted and stored information.

"Proposal modification" is a change made to a proposal before the solicitation's closing date and time, or made in response to an amendment, or made to correct a mistake at any time before award.

"Proposal revision" is a change to a proposal made after the solicitation closing date, at the request of or as allowed by a Contracting Officer as the result of negotiations.

"Time," if stated as a number of days, is calculated using calendar days, unless otherwise specified, and will include Saturdays, Sundays, and legal holidays. However, if the last day falls on a Saturday, Sunday, or legal holiday, then the period shall include the next working day.

(b) *Amendments to solicitations.* If this solicitation is amended, all terms and conditions that are not amended remain unchanged. Offerors shall acknowledge receipt of any amendment to this solicitation by the date and time specified in the amendment(s).

(c) *Submission, modification, revision, and withdrawal of proposals.*

(1) Unless other methods (e.g., electronic commerce or facsimile) are permitted in the solicitation, proposals and modifications to proposals shall be submitted in paper media in sealed envelopes or packages (i) addressed to the office specified in the solicitation, and (ii) showing the time and date specified for receipt, the solicitation number, and the name and address of the offeror. Offerors using commercial carriers should ensure that the proposal is marked on the outermost wrapper with the information in paragraphs (c)(1)(i) and (c)(1)(ii) of this provision.

(2) The first page of the proposal must show--

(i) The solicitation number;

(ii) The name, address, and telephone and facsimile numbers of the offeror (and electronic address if available);

(iii) A statement specifying the extent of agreement with all terms, conditions, and provisions included in the solicitation and agreement to furnish any or all items upon which prices are offered at the price set opposite each item;

(iv) Names, titles, and telephone and facsimile numbers (and electronic addresses if available) of persons authorized to negotiate on the offeror's behalf with the Government in connection with this solicitation; and

(v) Name, title, and signature of person authorized to sign the proposal. Proposals signed by an agent shall be accompanied by evidence of that agent's authority, unless that evidence has been previously furnished to the issuing office.

(3) *Submission, modification, revision, and withdrawal of*

*proposals.*

(i) Offerors are responsible for submitting proposals, and any modifications or revisions, so as to reach the Government office designated in the solicitation by the time specified in the solicitation. If no time is specified in the solicitation, the time for receipt is 4:30 p.m., local time, for the designated Government office on the date that proposal or revision is due.

(ii) (A) Any proposal, modification, or revision received at the Government office designated in the solicitation after the exact time specified for receipt of offers is "late" and will not be considered unless it is received before award is made, the Contracting Officer determines that accepting the late offer would not unduly delay the acquisition; and-

(1) If it was transmitted through an electronic commerce method authorized by the solicitation, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of proposals; or

(2) There is acceptable evidence to establish that it was received at the Government installation designated for receipt of offers and was under the Government's control prior to the time set for receipt of offers; or

(3) It is the only proposal received.

(B) However, a late modification of an otherwise successful proposal that makes its terms more favorable to the Government, will be considered at any time it is received and may be accepted.

(iii) Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the proposal wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.

(iv) If an emergency or unanticipated event interrupts normal Government processes so that proposals cannot be received at the office designated for receipt of proposals by the exact time specified in the solicitation, and urgent Government requirements preclude amendment of the solicitation, the time specified for receipt of proposals will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

(v) Proposals may be withdrawn by written notice received at any time before award. Oral proposals in response to oral solicitations may be withdrawn orally. If the solicitation authorizes facsimile proposals, proposals may be withdrawn via facsimile received at any time before award, subject to the conditions specified in the provision at 52.215-5, Facsimile Proposals. Proposals may be withdrawn in person by an offeror or an authorized representative, if the identity of the person requesting withdrawal is established and the person signs a receipt for the proposal before award.

(4) Unless otherwise specified in the solicitation, the offeror may propose to provide any item or combination of items.

(5) Offerors shall submit proposals in response to this solicitation in English, unless otherwise permitted by the solicitation, and in U.S. dollars, unless the provision at FAR 52.225-17, Evaluation of Foreign Currency Offers, is included in the solicitation.

(6) Offerors may submit modifications to their proposals at any time before the solicitation closing date and time, and may submit modifications in response to an amendment, or to correct a mistake at any time before award.

(7) Offerors may submit revised proposals only if requested or allowed by the Contracting Officer.



(8) Proposals may be withdrawn at any time before award. Withdrawals are effective upon receipt of notice by the Contracting Officer.

(d) *Offer expiration date.* Proposals in response to this solicitation will be valid for the number of days specified on the solicitation cover sheet (unless a different period is proposed by the offeror).

(e) *Restriction on disclosure and use of data.* Offerors that include in their proposals data that they do not want disclosed to the public for any purpose, or used by the Government except for evaluation purposes, shall—

(1) Mark the title page with the following legend:

This proposal includes data that shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed in whole or in part for any purpose other than to evaluate this proposal. If, however, a contract is awarded to this offeror as a result of or in connection with the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in sheets [insert numbers or other identification of sheets]; and

(2) Mark each sheet of data it wishes to restrict with the following legend:

Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal.

(f) *Contract award.* (1) The Government intends to award a contract or contracts resulting from this solicitation to the responsible offeror(s) whose proposal(s) represents the best value after evaluation in accordance with the factors and subfactors in the solicitation.

(2) The Government may reject any or all proposals if such action is in the Government's interest.

(3) The Government may waive informalities and minor irregularities in proposals received.

(4) The Government intends to evaluate proposals and award a contract without discussions with offerors (except clarifications as described in FAR 15.306(a)). Therefore, the offeror's initial proposal should contain the offeror's best terms from a cost or price and technical standpoint. The Government reserves the right to conduct discussions if the Contracting Officer later determines them to be necessary. If the Contracting Officer determines that the number of proposals that would otherwise be in the competitive range exceeds the number at which an efficient competition can be conducted, the Contracting Officer may limit the number of proposals in the competitive range to the greatest number that will permit an efficient competition among the most highly rated proposals.

(5) The Government reserves the right to make an award on any item for a quantity less than the quantity offered, at the unit cost or prices offered, unless the offeror specifies otherwise in the proposal.

(6) The Government reserves the right to make multiple awards if, after considering the additional administrative costs, it is in the Government's best interest to do so.

(7) Exchanges with offerors after receipt of a proposal do not constitute a rejection or counteroffer by the Government.

(8) The Government may determine that a proposal is unacceptable if the prices proposed are materially unbalanced between line items or subline items. Unbalanced pricing exists when, despite an acceptable total evaluated price, the price of one or more contract line items is significantly overstated or understated as indicated by the application of cost or price analysis techniques. A proposal may be rejected if the Contracting Officer determines that the lack of balance poses an unacceptable

risk to the Government.

(9) If a cost realism analysis is performed, cost realism may be considered by the source selection authority in evaluating performance or schedule risk.

(10) A written award or acceptance of proposal mailed or otherwise furnished to the successful offeror within the time specified in the proposal shall result in a binding contract without further action by either party.

(11) The Government may disclose the following information in postaward debriefings to other offerors:

(i) The overall evaluated cost or price and technical rating of the successful offeror;

(ii) The overall ranking of all offerors, when any ranking was developed by the agency during source selection;

(iii) A summary of the rationale for award; and

(iv) For acquisitions of commercial items, the make and model of the item to be delivered by the successful offeror.

(End of provision)

## **6 CHANGES PRIOR TO RECEIVING OFFERS**

The right is reserved, as the interest of the Government may require, to revise the specifications and/or [Request For Proposal][solicitation] drawings prior to the date set for receiving offers. Such revisions will be announced by an amendment or amendments to this [Request For Proposal][solicitation]. It shall be the responsibility of the prospective offeror, subcontractor or supplier to obtain copies of amendments from the website listed in paragraph: PLAN HOLDER'S LIST below. The Government may (but not required) send an amendment notification to let prospective offerors know that an amendment has been issued.

## **7 (FAR 52.216-1) TYPE OF CONTRACT (APR 1984).**

The Government contemplates award of a firm fixed price contract resulting from this solicitation.

(End of provision)

## **8 (FAR 52.204-6) DATA UNIVERSAL NUMBERING SYSTEM (DUNS) NUMBER (JUNE 1999)**

(a) The offeror shall enter, in the block with its name and address on the cover page of its offer, the annotation "DUNS" followed by the DUNS number that identifies the offeror's name and address exactly as stated in the offer. The DUNS number is a nine-digit number assigned by Dun and Bradstreet Information Services.

(b) If the offeror does not have a DUNS number, it should contact Dun

and Bradstreet directly to obtain one. A DUNS number will be provided immediately by telephone at no charge to the offeror. For information on obtaining a DUNS number, the offeror, if located within the United States, should call Dun and Bradstreet at 1-800-333-0505. The offeror should be prepared to provide the following information:

- (1) Company name.
- (2) Company address.
- (3) Company telephone number.
- (4) Line of business.
- (5) Chief executive officer/key manager.
- (6) Date the company was started.
- (7) Number of people employed by the company.
- (8) Company affiliation.

(c) Offerors located outside the United States may obtain the location and phone number of the local Dun and Bradstreet Information Services office from the Internet home page at <http://www.customerservice@dnb.com>. If an offeror is unable to locate a local service center, it may send an e-mail to Dun and Bradstreet at [globalinfo@mail.dnb.com](mailto:globalinfo@mail.dnb.com).

(End of provision)

## **9 SMALL BUSINESS SIZE STANDARD.**

The small business size standard is gross annual receipts for its preceding 3 fiscal years did not exceed \$27.5 million.

## **10 NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS).**

In accordance with Subsector 233 of the NAICS Manual, the work in this solicitation is assigned classification code 23332.

## **11 (DFARS 252.204-7004) REQUIRED CENTRAL CONTRACTOR REGISTRATION (NOV 2001)**

(a) Definitions.

As used in this clause--

(1) "Central Contractor Registration (CCR database" means the primary DoD repository for contractor information required for the conduct of business with DoD.

(2) "Data Universal Numbering System (DUNS) number" means the 9-digit number assigned by Dun and Bradstreet Information Services to identify unique business entities.

(3) "Data Universal Numbering System +4 (DUNS+4) number" means the

DUNS number assigned by Dun and Bradstreet plus a 4-digit suffix that may be assigned by a parent (controlling) business concern. This 4-digit suffix may be assigned at the discretion of the parent business concern for such purposes as identifying subunits or affiliates of the parent business concern.

(4) "Registered in the CCR database" means that all mandatory information, including the DUNS number or the DUNS+4 number, if applicable, and the corresponding Commercial and Government Entity (CAGE) code, is in the CCR database; the DUNS number and the CAGE code have been validated; and all edits have been successfully completed.

(b)(1) By submission of an offer, the offeror acknowledges the requirement that a prospective awardee must be registered in the CCR database prior to award, during performance, and through final payment of any contract resulting from this solicitation, except for awards to foreign vendors for work to be performed outside the United States.

(2) The offeror shall provide its DUNS or, if applicable, its DUNS+4 number with its offer, which will be used by the Contracting Officer to verify that the offeror is registered in the CCR database.

(3) Lack of registration in the CCR database will make an offeror ineligible for award.

(4) DoD has established a goal of registering an applicant in the CCR database within 48 hours after receipt of a complete and accurate application via the Internet. However, registration of an applicant submitting an application through a method other than the Internet may take up to 30 days. Therefore, offerors that are not registered should consider applying for registration immediately upon receipt of this solicitation.

(c) The Contractor is responsible for the accuracy and completeness of the data within the CCR, and for any liability resulting from the Government's reliance on inaccurate or incomplete data. To remain registered in the CCR database after the initial registration, the Contractor is required to confirm on an annual basis that its information in the CCR database is accurate and complete.

(d) Offerors and contractors may obtain information on registration and annual confirmation requirements by calling 1-888-227-2423, or via the Internet at <http://www.ccr.gov>.

(End of clause)

## **12 (FAR 52.236-28)                      PREPARATION OF PROPOSALS—CONSTRUCTION (OCT 1997)**

(a) Proposals must be (1) submitted on the forms furnished by the Government or on copies of those forms; and (2) manually signed. The person signing a proposal must initial each erasure or change appearing on any proposal form.

(b) The proposal form may require offerors to submit proposed prices for one or more items on various bases, including—

(1) Lump sum price;

(2) Alternate prices;  
(3) Units of construction; or  
(4) Any combination of paragraphs (b)(1) through (b)(3) of this provision.

(c) If the solicitation requires submission of a proposal on all items, failure to do so may result in the proposal being rejected without further consideration. If a proposal on all items is not required, offerors should insert the words "no proposal" in the space provided for any item on which no price is submitted.

(d) Alternate proposals will not be considered unless this solicitation authorizes their submission.

(End of provision)

**13 (FAR 52.233-2) SERVICE OF PROTEST (AUG 1996).**

(a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgement of receipt from District Counsel, 106 South 15th Street, Omaha, Nebraska 68102-1618.

(b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

**14 (FAR 52.236-27) SITE VISIT (CONSTRUCTION) (FEB 1995).**

(a) The clauses at 52.236-2, Differing Site Conditions, and 52.236-3, Site Investigations and Conditions Affecting the Work, will be included in any contract awarded as a result of this solicitation. Accordingly, offerors or quoters are urged and expected to inspect the site where the work will be performed.

(b) **Site Visits:** Two site visits will be held for the Control Tower project. The first site visit will be held on 07 March 2002 starting at 1:00 p.m. MST. The second site visit will be held on 14 March 2002 starting at 1:00 p.m. MST. Place of assembly will be at the USACE Resident Office, Building 8110, Industrial Door #7, U.S. Air Force Academy, CO 80840. Telephone (719) 333-2973 or FAX (719) 333-2979. All contractors must stop at the main Academy entrance and display a valid driver's license for entry into the Academy.

**15 OFFEROR'S QUESTIONS AND COMMENTS.**

Questions and/or comments relative to these documents should be submitted via e-mail or mailed to: U.S. Army Corps of Engineers, Omaha District, ATTN: CENWO-CT-M 106 South 15th Street, Omaha, NE 68102-1618. Comments should reach this office no later than 20 calendar days prior to the date set for receiving of proposals, if feasible, in order that changes, if needed, may be added by amendment. E-mail addresses, FAX numbers, items for question and

points of contact are listed below. Phone calls with questions should be made between 8:30 a.m. and 3:30 p.m. (Central Standard Time) Monday through Friday.

**Note: A courtesy copy of all questions shall be sent to the Contract Specialist (Contractual Matters Point of Contact), the Program Manager and the Specifications Section (Technical Contents Points of Contact), except for Small Business questions. Small Business questions shall go to the Small Business Matters point of contact.**

<u>Items for Question</u>	<u>Points of Contact/ Phone numbers/ FAX Numbers</u>	<u>E-mail Addresses</u>
Contractual Matters:	Tamara.A.Brunow@usace.army.mil	
Ordering CD-Rom of the proposal documents (limit One per firm)/ amendments**/ Receipt of Proposals	402-221-3527 (phone) 402-221-4199 (fax)	
Planholder's List	See paragraph: PLAN HOLDER'S LIST, below.	
Small Business Matters	Hubert Carter 402-221-4110 (phone)	hubert.j.carter@usace.army.mil
Technical Contents Of Proposal Documents	Jay Hodges 402-221-3986 (phone) 402-221-4828 (fax)	Jay.D.Hodges@usace.army.mil
CD-ROM	Specifications Section Mike Pesci 402-221-4413 (phone) 402-221-3842 (fax)	Michael.R.Pisci@usace.army.mil
Site Inspection	See Paragraph: SITE INSPECTION, above	

**\*\* - The Government may elect to send a notification that an amendment has been posted to the Government's web address, but is not required to. It shall be the Contractor's, Subcontractor's and Supplier's responsibility to check the Government's web address for amendments.**

#### **15.1 PLAN HOLDER'S LIST.**

The CD-Rom will provide a list of plan holders that have registered at the time the CD-Rom was created. It is offeror's responsibility to check for any updates to the plan holder's list, which is available at the following web address:

<http://ebs-nwo.wes.army.mil/>

## **16 GENERAL DESCRIPTION OF WORK.**

Scope of project includes all work required to design and construct a Control Tower located at the United States Air Force Academy, Colorado. Work shall be in accordance with Request for Proposal documents issued with this solicitation.

## **17 PROPOSAL SUBMISSION REQUIREMENTS AND INSTRUCTIONS.**

See Section 00110 PROPOSAL SUBMISSION REQUIREMENTS AND INSTRUCTIONS.

## **18 SOURCE SELECTION BOARD (SSB).**

The Contracting Officer has established a Source Selection Board to conduct an evaluation of each proposal received in response to this Solicitation. The evaluation will be based exclusively on the merits and content of the proposal and any subsequent discussion required. The identities of the SSB personnel are confidential, and any attempt by the proposers to contact these individuals is prohibited.

## **19 PROPOSAL EVALUATION AND CONTRACT AWARD**

See Section 00120 PROPOSAL EVALUATION AND CONTRACT AWARD

## **20 COLORADO SALES AND USE TAX.**

Specific exemption from the Colorado Sales and Use Taxes will be granted by the Colorado Tax authorities with respect to all materials used by a prime Contractor or subcontractor and which are built into structures furnished under contract to a Government agency. The Colorado Sales and Use Taxes shall be excluded from the bid prices. Exemption certificates are available to both Contractors and subcontractors provided personal application is made therefor to the Department of Revenue, State of Colorado, State Capitol Annex, Denver, Colorado. The Contractor or subcontractor will be required to submit the date of the contract, the amount of the contract, and the proposed date for completion of the contract. Telephone: (303) 534-1208 (General Information).

### **20.1 CITY TAXES.**

The Municipality of Colorado Springs also has a sales and use tax. The Municipal tax authorities should be contacted by the bidder to determine applicability of the tax to this project.

## **REQUIRED CENTRAL CONTRACTOR REGISTRATION (CCR)**

**Register Now:** Don't wait until you submit an offer on a solicitation. You must be registered to receive the contract award. It can often take 30 days for CCR to process your registration information.

### **Register One of Three Ways:**

**Internet:** <http://www.ccr.gov>

**Value Added Network (VAN) for EDI users:** Contact your VAN for information. If you need to find a VAN look at [http://www.acq.osd.mil/ec/ecip/van\\_list.htm](http://www.acq.osd.mil/ec/ecip/van_list.htm)

**FAX or Mail:** Call (888)227-2423 or (616)961-4725 to receive a registration package. FAX or mail the completed information to the CCR Assistance Center. It can take up to 30 days to process a faxed or mailed package.

**CCR Assistance Center**  
74 Washington Street North, Suite 7  
Battle Creek, MI 49017-3084  
**FAX:** (616)961-7243



**SECTION 00110**

**PROPOSAL SUBMISSION REQUIREMENTS AND INSTRUCTIONS**

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**SECTION 00110**

**PROPOSAL SUBMISSION REQUIREMENTS AND INSTRUCTIONS**

**1. WHO MAY SUBMIT**

This solicitation is unrestricted and open to both large and small business participation.

**2. GENERAL REQUIREMENTS**

In order to effectively and equitably evaluate all proposals, the Contracting Officer must receive information sufficiently detailed to clearly indicate compliance with the proposal submission requirements.

**3. SIZE OF PRINTED MATTER SUBMISSIONS**

All written portions (other than the organization chart) shall be in 8-1/2" x 11" format.

**4. WHERE TO SUBMIT**

Offerors shall submit their proposal packages to the USACE Contracting Activity at the address shown in Block 8 of Standard Form 1442.

**5. SUBMISSION DEADLINE**

Due to heightened security at Government installations, those offerors who have their proposals hand-delivered shall contact Loreen Blume, Contract Specialist at (402) 221-4265 prior to delivering to the U.S. Army Corps of Engineer District, Omaha, 106 South 15<sup>th</sup> Street, Omaha, NE 68102-1618.

On the date specified and for thirty (30 minutes) prior to time specified on the Standard Form SF 1442, Page 00010-1, Item 13A, a Contracting Representative will be in the lobby to accept proposals. At the time specified on the Standard Form 1442, Page 00010-0, Item 13.A, it will be announced that receipt of proposals is closed. Official time will be established by the clock located in the area where proposals are received.

**6. PROPOSAL REQUIREMENTS AND SUBMISSION FORMAT**

- a. Offerors shall submit the original along with five (5) copies of their proposal, each shall consist of a 3-ring binder with Tabs (dividers) separating each Tab component described herein. Please designate as "Binder No. 1" on the original and copies.

**Binder No.1**

Tab 1 - Design Experience

Tab 2 - Construction Experience

Tab 3 - Design Personnel

Tab 4 – Construction Personnel

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Tab 5 - Past Performance (Design)

Tab 6 - Past Performance (Construction)

Tab 7 - Project Management Plan (PMP)

Tab 8 - Utilization of Small Business Concerns

- b. Offerors shall submit the original and five (5) copies of their price proposal contained in a 3-ring binder and designated "Binder No. 2".

### **Binder 2**

Single Tab with Price

All proposals shall contain the evaluation requirements stated herein and every binder shall also contain: Table of Contents, List of Tables (if required), List of Figures (if required), List of Appendixes, and Name/Address/Telephone Number of the Offeror. Proposal clarity, organization (as requested in this solicitation) and cross referencing is mandatory. No material (information not part of proposal) shall be incorporated by reference. The offeror shall submit in the proposal the requested information specified herein. ***Note: Tabs 1-8 are shown below in descending order of importance, excluding Binder 2 (Price), which is approximately equal to all of the combined tab elements contained in Binder No. 1.***

Tab 1 - Design Experience & Tab 2 - Construction Experience (equal)

Tab 3 - Design Personnel & Tab 4 – Construction Personnel (equal)

Tab 5 - Past Performance, Design & Tab 6 - Past Performance, Construction (equal)

Tab 7 - Project Management Plan (PMP)

Tab 8 - Utilization of Small Business Concerns

### **6.1 TAB 1 - DESIGN EXPERIENCE**

If you do not want the data submitted disclosed by the Government, follow the procedure specified in Section 00100 INSTRUCTIONS, CONDITIONS AND NOTICES TO OFFERORS, paragraph: RESTRICTION ON DISCLOSURE AND USE OF DATA.

Design team shall have recent experience in designing Control Towers of similar scope and complexity as this project. Submit four (4) projects designed by your firm that most clearly illustrates your experience, in designing Control Towers. In addition, these projects should demonstrate applicable Military Design experience and Design/Build experience. Provide each project example on one or two typed sheets along with picture/photo, also list the designers presented below in Tab 3 "Design Personnel" if they participated in the project example. No more than four (4) projects may be submitted. Submission of fewer than four (4) projects will reduce the proposer's rating in this category. Include a brief scope description for each project. Project examples may include (in descending order of preference) Military USAF Control Tower designed and constructed (Preferably design/build), Military (non-USAF), U.S. Government Agency Control Tower designed and constructed (Preferably design/build), or non-government private sector design-build Control Towers; and non-government, non-design/build constructed Control Towers. Projects should be at least

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\$3,000,000 in construction cost and completed within the past five (5) years of the date that proposals for the Control Tower are due. Project examples may include past experience as a prime design-build agent or joint venturer. If a joint venture has been formed for this contract only, include a brief description of previous experience with the Construction Contractor.

### 6.2 TAB - 2 CONSTRUCTION EXPERIENCE

If you do not want the data submitted disclosed by the Government, follow the procedure specified in Section 00100 INSTRUCTIONS, CONDITIONS AND NOTICES TO OFFERORS, paragraph: RESTRICTION ON DISCLOSURE AND USE OF DATA.

In this tab, the offeror should submit four (4) project summaries of construction projects which best illustrate his experience on Control Tower construction. Each project summary should consist of a one or two page narrative of the project discussing the project and providing specifics as noted herein. No more than 4 (four) projects may be submitted. However, if four Control Tower construction projects are not included in the proposal, the firm's proposal will be evaluated less favorably than those firms submitting four (4). Each project cited should have a construction dollar value of at least \$3,000,000 and completed within the past five (5) years. **Indefinite-Delivery, Indefinite Quantity (IDIQ) Contracts, where numerous Task Orders are summed to meet the minimum construction dollar value identified herein, are not acceptable.** Only those projects for which the offeror was the prime contractor should be submitted. Summaries for each project example submitted should include Control Towers the primes firm has constructed along with picture/photo of the each project example. List key construction personnel presented below in Tab 4 "Construction Personnel" if they participated in the project example. No more than four (4) projects may be submitted. Submission of fewer than four (4) projects will reduce the proposer's rating in this category. Include a brief scope description for each project. Project examples may include (in descending order of importance) Military USAF Control Tower constructed (Preferably design/build), Military (non-USAF), U.S. Government Agency Control Tower constructed (Preferably design/build), or non-government Control Tower constructed (preferably design/build). Project examples may also include, non-government private sector design-build Control Towers constructed; and non-government, non-design/build Control Towers constructed. Additional project example information shall include: a description of the project; construction contract award amount; final construction cost; location; date when the project was started; original contract finish date and actual finish date. All summaries shall contain the name, address, telephone and fax number of a representative of the owner (as well as one alternate individual not affiliated with your firm) familiar with your firm's experience on the project that can verify the experience cited.

### 6.3 TAB 3 - DESIGN PERSONNEL

If you do not want the data submitted disclosed by the Government, follow the procedure specified in Section 00100 INSTRUCTIONS, CONDITIONS AND NOTICES TO OFFERORS, paragraph: RESTRICTION ON DISCLOSURE AND USE OF DATA.

Submit one or two page resumes of lead and support design personnel, for categories listed below, who will work on this project. The design team should be composed of project managers, registered architects, or engineers, or a multi-discipline design firm with project managers, registered architects and engineers on staff providing complete facility design services. Project Managers and Lead designers should be registered professional architects or engineers (preferably registered in the state of Colorado) with at least 5 years experience as a registered professional in the design of similar projects. Include examples of constructed projects the Project Manager and lead designers/design team has worked on together. Project examples may include (in descending order of importance) Military USAF Control Tower constructed (Preferably design/build), Military (non-USAF), U.S. Government Agency Control Tower constructed (Preferably design/build), or non-government Control Tower constructed (preferably design/build). Project examples may also include, non-government private sector design-build Control Towers constructed; and non-government, non-design/build Control Towers constructed. Projects should be at least \$3,000,000 in construction cost and completed within the past 5 years of the date that proposals for the Control Tower are due. The design team should include the

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following disciplines:

- Project Manager (Registered Architect or Engineer)
- Registered Architect
- Registered Structural Engineer with training related to the 1997 National Earthquake Hazard Reduction Program (NEHRP)
- Registered Mechanical Engineer
- Registered Electrical Engineer
- Registered Fire Protection Engineer
- Registered Civil Engineer
- Registered Landscape Architect
- Interior Designer - Certified by the National Council of Interior Designers Qualifications (NCIDQ)

If, because of reasons beyond the control of the design team, the named individuals are not able to fulfill this obligation, replacement personnel with similar education and experience shall be presented for acceptance by the Contracting Officer.

Resumes for each designer shall have associated dates for their submitted experience. In addition, Submit a company resume and include your past experience as a prime design/build agent, joint venturer, or for joint ventures formed for this contract only, design agent experience in comparable projects. Include an Organizational Chart indicating all design team members proposed under Tab 3.

### 6.4 TAB 4 - CONSTRUCTION PERSONNEL

If you do not want the data submitted disclosed by the Government, follow the procedure specified in Section 00100 INSTRUCTIONS, CONDITIONS AND NOTICES TO OFFERORS, paragraph: RESTRICTION ON DISCLOSURE AND USE OF DATA.

In this tab, the proposer should present the names and resumes for key construction personnel that will be assigned to this project. In addition, provide a summary of the duties and responsibilities of these individuals, which clearly indicate separate duties and responsibilities for each individual. As a minimum, this tab should include data on the following personnel:

- a. Project Manager
- b. Project Superintendent
- c. CQC System Manager

The proposal shall clearly present the credentials of each person, and shall show that each meets the requirements listed below. Resumes should include examples of project experience (including what capacity the individual served on each project), as well as the **dates** employed on each project, and the monetary size of each project cited as experience. In addition, the educational qualifications of the proposed personnel shall be submitted. Prior experience on military construction projects is preferred and will be evaluated more favorably. If, because of reasons beyond the control of the construction firm, the individuals named in this proposal are not able to be utilized on this project, replacement personnel with similar skills and experience shall be presented for acceptance and approval by the Contracting Officer. Replacement individuals for this project shall be required to have qualifications and experience meeting or exceeding those identified in the proposal.

**Project Manager:** The Project Manager should be a registered engineer, registered architect or graduate

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construction manager and should have at least 5 years experience as a Project Manager on projects similar to this project.

**Project Superintendent:** The Project Superintendent should be a graduate engineer or experienced construction person and should have at least 5 years experience as a Project Superintendent on projects similar to this project.

**Contractor Quality Control (CQC) System Manager:** The Contractor Quality Control System (CQC) Manager should be a graduate engineer or experienced construction person with a minimum of 5 years experience as a CQC System Manager on projects similar to the PFC.

### 6.5 TAB 5 - PAST PERFORMANCE, DESIGN

If you do not want the data submitted disclosed by the Government, follow the procedure specified in Section 00100 INSTRUCTIONS, CONDITIONS AND NOTICES TO OFFERORS, paragraph: RESTRICTION ON DISCLOSURE AND USE OF DATA.

If available, the Offeror shall submit Architect-Engineer Contract Administration Support System (ACASS) Performance Evaluations received on DOD government projects over the last 5 years. Any past performance, design in the last 5 years the Offeror wishes to submit outside ACASS shall be submitted on the attached Past Performance Summary Sheet (Design) and must be completed by an owner or owner's representative and included in the proposal. In the event the Offeror has no past performance (design) information, a neutral rating will be provided. ***Note: For each private sector project submitted (outside ACASS) as a summary in paragraph 6.1 above, the Offeror shall provide a completed Performance Summary Sheet (Design) for that project.*** A blank copy of the Performance Summary Sheet (Design) is attached to this section.

Copies of records contained in the Corps of Engineers ACASS Database may be requested by fax on company letterhead at the following telefax number: (503) 808-4596. For performance evaluation on DOD or non-DOD government projects, the Government reserves the right to contact the evaluator to verify your firm's construction experience. A blank copy of the Performance Summary Sheet (Design) is attached to this section.

### 6.6 TAB 6 - PAST PERFORMANCE, CONSTRUCTION

If you do not want the data submitted disclosed by the Government, follow the procedure specified in Section 00100 INSTRUCTIONS, CONDITIONS AND NOTICES TO OFFERORS, paragraph: RESTRICTION ON DISCLOSURE AND USE OF DATA.

If available, the Offeror shall submit **all** Construction Contractor Appraisal Support System (CCASS) Performance Evaluations (Construction) received on DOD government projects over the last 6 years. Any past performance, design in the last 5 years the Offeror wishes to submit outside CCASS shall be submitted on the attached Past Performance Summary Sheet (Construction) and must be completed by an owner or owner's representative and included in the proposal. In the event the Offeror has no past performance (construction) information, a neutral rating will be provided. ***Note: For each private sector project (outside CCASS) submitted as a summary in paragraph 6.2 above, the Offeror shall provide a completed Performance Summary Sheet (Construction) for that project.***

Copies of records contained in the Corps of Engineers CCASS Database may be requested by fax on company letterhead at the following telefax number: (503) 808-4596. For performance evaluation on DOD or non-DOD government projects, the Government reserves the right to contact the evaluator to verify your firm's construction experience. A blank copy of the Performance Summary Sheet (Construction) is attached to this section.

## **6.7 TAB 7 - PROJECT MANAGEMENT PLAN (PMP)**

If you do not want the data submitted disclosed by the Government, follow the procedure specified in Section 00100 INSTRUCTIONS, CONDITIONS AND NOTICES TO OFFERORS, paragraph: RESTRICTION ON DISCLOSURE AND USE OF DATA.

This tab shall include a comprehensive PMP developed specifically for this project. The information in the PMP should make it clear that the offeror has the ability to deliver a quality product and effectively manage the designers, consultants and subcontractors on the team, as well as the ability to coordinate all work throughout the design and construction phases. The PMP shall include an explanation of the total project team management approach for both the design team and the construction team. It shall include: management of firms included within the design team and construction team, specific quality control procedures used (including Quality Control procedures to be used to limit re-submittals, design errors, and poor coordination between the prime design firm and design consultant), schedule development, and address internal methods and safeguards for adherence of schedule. In addition, it should address the acquisition of environmental permits in a timely fashion, safety, preparation and submission of As-Built documents, and contract close-out. It should discuss how the design team will support the Contractor during construction and an organizational chart showing the inter-relationship of management and various team components. In addition, the PMP should address the relationship between designer and construction contractor and should clearly indicate an understanding of the design-build process. An organizational chart shall be included and it may be a foldout.

## **6.8 TAB 8 - UTILIZATION OF SMALL BUSINESS CONCERNS**

If you do not want the data submitted disclosed by the Government, follow the procedure specified in Section 00100 INSTRUCTIONS, CONDITIONS AND NOTICES TO OFFERORS, paragraph: RESTRICTION ON DISCLOSURE AND USE OF DATA.

The Offeror, if not a Small Business Concern, shall demonstrate how the firm plans to identify, commit and utilize Small Business (**SB**), Small Disadvantaged Business (**SDB**), HUBZone Small Business, Women-owned Small Business (**WOSB**) concerns, Severely Disabled Veterans (**SDV**), and Historical Black Colleges and Minority Institutions (**HBCU/MI**) as team members, subcontractors and/or suppliers in the performance of the resultant contract of this solicitation. It is the policy of the U.S. Army Corps of Engineers, Omaha District (CENWO) that small business concerns have the maximum practicable opportunity to participate in performing contracts let by the Contracting Activity (CENWO-CT). It is further the policy of the CENWO that its large-business prime contractors demonstrate the extent they plan to utilize small business concerns in any resultant contract and provide assurance in its offer that small business concerns will have maximum subcontracting opportunities in its prime contracts. If the contractor is a Small Business Concern, this tab may include a single sheet stating that the contractor is a Small Business Concern, in lieu of compiling the information requested herein.

### **6.8.1 Definitions**

- a. Small Business Concerns. For the purpose of this section, small business concerns refer to Small Business, Small Disadvantaged Business, Women-owned Small Business, HUBZone Small Business, Severely Disabled Veterans (SDV), Historically Black College and University and Minority Institutions.
- b. Prime Contractor. For the purpose of this section, a prime contractor refers to both large and small contractors.
- c. Offeror: For the purpose of this section, offeror refers to both large and small contractors.

CONTROL TOWER, USAF ACADEMY, CO

d. Floor: "Floor" is the term the U.S. Army Corps of Engineers use to replace goal. It represents the minimum level for small business performance.

The Offeror's proposal should demonstrate the utilization and participation of small business concerns. The proposal should clearly state factors that demonstrate a strong commitment to use small business concerns. Enforceable commitments to use small business concerns will be weighed more heavily than non-enforceable ones. The evaluation of utilization and participation of small business concerns is separate and distinct from the requirement at Federal Acquisition Regulation (FAR) Clause 52.219-9, Small Business Subcontracting Plan.

This tab, as a minimum, should include:

Subparagraphs are listed in descending order of importance for purposes of proposal evaluation.

a. Development of percentage floors based on planned subcontracting which is challenging yet realistic. The following floors are considered reasonable and obtainable for requirements awarded in Fiscal Year 2001.

- (i) 61.4% of planned subcontracting dollars to be placed with all small business concerns.
- (ii) 9.1% of planned subcontracting dollars to be placed with those small business concerns owned and controlled by socially and economically disadvantaged individuals.
- (iii) 5.0% of planned subcontracting dollars to be placed with women-owned small business concerns.
- (iv) 3.0% of planned subcontracting dollars with Severely Disabled Veterans Small Business concerns.
- (v) 2.5% of planned subcontracting dollars with Hubzones Small Business Concerns.
- (vi) 10% of planned subcontracting dollars with HBCU/MI Small Business Concerns.

b. Past Performance in Meeting Small Business Floors. Demonstrate how floors for SB, SDB and WOSB participation were satisfied on previous contracts. Extent to which the prime has historically been successful in establishing realistic yet challenging goals and evidences ability to achieve them. The Offeror should submit data on Past Performance in meeting small business goals which will demonstrate how goals for small business concerns participation on previous contracts was satisfied. The data to be provided should include: (1) Client/Customer (2) Contract/Identification Number (3)Project Description (4) Contract Amount (5) Reference or Point of Contract (to include address and telephone number).

c. Demonstrate utilization and participation of small business concerns, clearly stated factors that demonstrate strong commitments to use SB, SDB, WOSB, SDV, and HBCU/MI as team members, subcontractors, and/or suppliers.

d. Description of supplies and services to be subcontracted and planned for subcontracting to SBs, SDBs, WOSBs, SDVs, and HBCUs/MIs.

e. Assurances that the offeror will include the clause at FAR 52.219-8, Utilization of Small Business Concerns in all subcontracts that offer further subcontracting opportunities, and that the offeror will require subcontractor (including small business concerns) that receive subcontracts in excess of \$500,000 (\$1,000,000 for construction) to adopt a small business participation program similar to the requirements of the resultant contract.



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**6.9 BINDER 2 - PRICE (IN THIS BINDER, THE OFFEROR SHALL SUBMIT THE INFORMATION SPECIFIED HEREIN)**

- a. Section 00010, Solicitation/Contract Form and Pricing Schedule.** The total cost for the design and construction will be considered for evaluation. Proposed price will be utilized in the establishment of the competitive range.
- b. Section 00600, Representations, Certifications and Other Statements of Offerors.** This item is not considered for evaluation, but is a required item.

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CONTROL TOWER, USAF ACADEMY, CO

**PERFORMANCE SUMMARY SHEET (CONSTRUCTION)**

**SOLICITATION NUMBER DACA45-02-R-00\_\_**

Contractor's Name: \_\_\_\_\_

Project Name: \_\_\_\_\_

Project Location: \_\_\_\_\_

Name & Title of Person Completing this Summary \_\_\_\_\_

Name of Firm of Person Completing this Summary: \_\_\_\_\_

Signature of Person Completing this Summary: \_\_\_\_\_

Date: \_\_\_\_\_ Phone Number: \_\_\_\_\_

1. Overall Rating of this Contractor:

- \_\_\_\_ Exceptional
- \_\_\_\_ Above Average
- \_\_\_\_ Average
- \_\_\_\_ Marginal
- \_\_\_\_ Unacceptable

2. Cost Growth:

Original Construction Contract Award Amount: \_\_\_\_\_

Final Construction Contract Amount: \_\_\_\_\_

In your opinion, which of the following statement best describes your experience with cost growth on this project:

- \_\_\_\_ a. The contractor did not contribute to any cost growth.
- \_\_\_\_ b. The contractor contributed to some degree to the cost growth experienced on this project.
- \_\_\_\_ c. The contractor contributed significantly to the cost growth experienced on this project.

Any additional cost growth comments:

CONTROL TOWER, USAF ACADEMY, CO

**PERFORMANCE SUMMARY SHEET**

**SOLICITATION NUMBER DACA45-02-R-00\_\_**

3. Time Growth:

Original Contract Completion Date: \_\_\_\_\_

Final Contract Completion Date: \_\_\_\_\_

In your opinion, which of the following statement best describes your experience with time growth on this project:

\_\_\_\_ a. The contractor did not contribute to any time growth.

\_\_\_\_ b. The contractor contributed to some degree to the time growth experienced on this project.

\_\_\_\_ c. The contractor contributed significantly to the time growth experienced on this project.

Any additional time growth comments:

4. Quality: Which of the following statements most accurately describe the quality of the work the contractor provided on your project:

\_\_\_\_ a. The work provided by the contractor was of high quality.

\_\_\_\_ b. The work provided by the contractor was of fair quality.

\_\_\_\_ c. The work provided by the contractor was of poor quality.

Any additional comments on quality:

5. The willingness of past customers to have a contractor perform more work for them is an indication of overall satisfaction with the contractor's performance. If you were to construct another project similar to the one recently completed, and you had the responsibility and total authority to select the contractor for the new project, which of the following statements most accurately depicts the approach you would take?

\_\_\_\_ a. I would have this contractor construct the new project.

\_\_\_\_ b. I would consider this contractor, but I would also explore the possibility of using other contractors to construct the project.

\_\_\_\_ c. I would not consider using this contractor to construct the new project.

6. Any additional comments (additional sheets may be added, if necessary):

CONTROL TOWER, USAF ACADEMY, CO

**PERFORMANCE SUMMARY SHEET (DESIGN)**

**SOLICITATION NUMBER DACA45-02-R-00\_\_**

Designer's Name: \_\_\_\_\_

Project Name: \_\_\_\_\_

Project Location: \_\_\_\_\_

Name & Title of Person Completing this Summary \_\_\_\_\_

Name of Firm of Person Completing this Summary: \_\_\_\_\_

Signature of Person Completing this Summary: \_\_\_\_\_

Date: \_\_\_\_\_ Phone Number: \_\_\_\_\_

1. Overall Rating of this Designer:

\_\_\_\_ Exceptional

\_\_\_\_ Above Average

\_\_\_\_ Average

\_\_\_\_ Marginal

\_\_\_\_ Unacceptable

2. Cost Growth:

In your opinion, which of the following statement best describes your experience with cost growth on this project:

\_\_\_\_ a. The designer did not contribute to any cost growth.

\_\_\_\_ b. The designer contributed somewhat to the cost growth experienced on this project.

\_\_\_\_ c. The designer contributed significantly to the cost growth experienced on this project.

Any additional cost growth comments:

CONTROL TOWER, USAF ACADEMY, CO

**PERFORMANCE SUMMARY SHEET Designers (Part 2)**

**SOLICITATION NUMBER DACA45-02-R-00\_\_**

3. Time Growth:

In your opinion, which of the following statement best describes your experience with time growth on this project:

- ☐ a. The designer did not contribute to any time growth.
- ☐ b. The designer contributed somewhat to the time growth experienced on this project.
- ☐ c. The designer contributed significantly to the time growth experienced on this project.

Any additional time growth comments:

4. Quality: Which of the following statements most accurately describe the quality of the work the designer provided on your project:

- ☐ a. The work provided by the designer was of high quality.
- ☐ b. The work provided by the designer was of fair quality.
- ☐ c. The work provided by the designer was of poor quality.

Any additional comments on quality:

5. The willingness of past customers to have a designer perform more work for them is an indication of overall satisfaction with the designer's performance. If you were to design/construct another project similar to the one recently completed, and you had the responsibility and total authority to select the designer for the new project, which of the following statements most accurately depicts the approach you would take?

- ☐ a. I would have this designer involved in the new project.
- ☐ b. I would consider this designer, but I would also explore the possibility of using other designers on this project.
- ☐ c. I would not consider using this designer on the new project.

6. Any additional comments (additional sheets may be added, if necessary):

**SECTION 00120**

**PROPOSAL EVALUATION AND CONTRACT AWARD**

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## **SECTION 00120**

### **PROPOSAL EVALUATION AND CONTRACT AWARD**

#### **1. EVALUATION OF PROPOSALS**

a. All proposals and documentation which have been properly submitted will be evaluated. Proposals received will be evaluated on the basis of the factors stated in the solicitation to select the responsible offeror whose proposal is most advantageous to the Government. Because of the number of proposals anticipated, uniformity of all proposals is essential to assure fair and accurate evaluation. All proposals must comply with the instructions in the solicitation.

b. All responsible offerors whose proposal has a reasonable chance of being selected will be included in the competitive range.

c. Discussions with owners, contract administrators, or other points of contact, provided by the offeror may affect the evaluation rating given for the factors being evaluated by those discussions.

d. Evaluations will be conducted in accordance with the Tradeoff Process, FAR 15.101-1. Tabs 1 through 8 will be rated using an adjectival methodology with a narrative assessment and Binder #2 (Price) will be evaluated after consensus scoring Tabs 1-8. Proposal evaluation is an assessment of the proposal and the offeror's ability to perform the resultant contract successfully. Proposals will be evaluated to determine ratings supported by narratives, and to identify strengths, weaknesses, and deficiencies of the proposed approach in each proposal.

#### **e. Evaluation Definitions.**

(1) Strength. A substantive aspect, attribute, or specific item in the proposal that exceeds the solicitation requirements and enhances the probability of successful contract performance.

(2) Weakness. A flaw in the proposal that increases the risk of unsuccessful contract performance. A significant weakness in the proposal is a flaw that appreciably increases the risk.

(3) Deficiency. A material failure of a proposal to meet a Government requirement or a combination of significant weaknesses in a proposal that increases the risk of unsuccessful contract performance to an unacceptable level.

(4) Clarification. Clarifications are limited exchanges between the Government and offerors that may occur when award without discussions is contemplated. If award without discussions is anticipated, offerors may be given the opportunity to clarify certain aspects of their proposals or to resolve minor or clerical errors.

(5) Communications. Communications are exchanges between the Government and offerors after receipt of proposals, leading to establishment of the competitive range.

(6) Discussions. Discussions are negotiations conducted in a competitive acquisition and take place after establishment of the competitive range. Discussions are tailored to each offeror's proposal, and shall be conducted



## CONTROL TOWER, USAF ACADEMY, CO

by the Contracting Officer with each offeror within the competitive range.

(7) **Rating.** The application of a scale of words, colors, or numbers, used in conjunction with narrative, to denote the degree to which the proposal has met the standard for a non-cost factor. For purposes of this solicitation, ratings will consist of words (adjectival method) used in conjunction with narratives. Ratings will be applied at the factor (tab) and subfactor level. If at any level of indentation an Offeror's proposal is evaluated as not meeting a minimum requirement (that is, below the level of acceptable), this fact must be included in the rating and narrative assessment at that level and each higher level of indentation. Therefore, a marginal or unacceptable rating at any level must be carried to the factor (tab) level. The following ratings will be used to evaluate Tabs 1 through 8:

(a) **Exceptional.** Exceeds requirements of the RFP, provides all required information stated in Section 00110 and is expressed in a manner indicating maximum benefit to the government.

(b) **Above Average.** Exceeds requirements of the RFP, provides all required information stated in Section 00110 and is expressed in a manner indicating significant benefit to the government.

(c) **Average.** Meets requirements of the RFP as required in Section 00110 and indicates benefits to the government.

(d) **Marginal.** Complies with the requirements of the RFP as required in Section 00110. The government may still receive benefit from the proposal submitted.

(e) **Unacceptable.** Fails to meet one or more of the requirements of the RFP as required in Section 00110. The government would not receive any benefit from the proposal submitted.

## **2. EVALUATION FACTORS FOR AWARD**

The areas to be evaluated include Evaluation Factors which will be evaluated based on the adjectival method of evaluation. The requirements specified in the solicitation are considered to be minimum requirements. A more favorable evaluation rating may be given for exceeding the minimum requirements.

### **EVALUATION FACTORS**

#### **Binder No. 1**

Tab 1 - Design Experience & Tab 2 - Construction Experience (equal)

Tab 3 - Design Personnel & Tab 4 - Construction Personnel (equal)

Tab 5 - Past Performance, Design & Tab 6 - Past Performance, Construction (equal)

Tab 7 - Project Management Plan (PMP)

Tab 8 - Utilization of Small Business Concerns

### **SUBJECTIVELY EVALUATED FACTORS**

#### **Binder No. 2**

## CONTROL TOWER, USAF ACADEMY, CO

### Price

Note that the evaluation factors listed above, other than Price, are listed in descending order of importance. A low evaluation rating for any tab, or combination of different tabs, may cause the proposal to be evaluated as unsatisfactory. Binder No. 2, Price will be evaluated in accordance the requirements listed in paragraph: EVALUATION OF PRICE below.

### **2.1 TAB 1 - DESIGN EXPERIENCE**

The experience of the offeror's design team in the design of Control Towers will be evaluated. Previous experience (Project examples) may include (in descending order of importance) Military USAF Control Tower designed and constructed (preferably design/build), Military (non-USAF), U.S. Government Agency Control Tower designed and constructed (preferably design/build), or non-government Control Tower designed and constructed (preferably design/build). However, military and design-build project experience will be evaluated more favorably than projects that are not military design projects or design-build. Non-military and non-design-build experience will be evaluated less favorably.

### **2.2 TAB - 2 CONSTRUCTION EXPERIENCE**

The Construction Contractor's experience in construction of facilities similar to the Control Tower will be evaluated. Project examples may include (in descending order of importance) Military USAF Control Tower designed and constructed (preferably design/build), Military (non-USAF) Control Tower designed and constructed (preferably design/build), U.S. Government Agency Control Tower designed and constructed (preferably design/build), or non-government Control Tower designed and constructed (preferably design/build). However, military and design-build project experience will be evaluated more favorably than projects that are not military design projects or design-build. Non-military and non-design-build experience will be evaluated less favorably.

### **2.3 TAB 3 - DESIGN PERSONNEL**

Qualifications of key design personnel assigned to this project (experience, professional registration and education as important factors) will be evaluated. Relatable military design-build project experience for lead personnel will be evaluated more favorably than projects which are not military or design-build. In descending order of importance, lower ratings will be given for relatable non-military design-build, military design, and non-military design experience. More favorable ratings are awarded for projects where personnel have previous experience with other members of the design team. More favorable ratings are awarded if lead personnel are registered in the state of Colorado.

### **2.4 TAB 4 - CONSTRUCTION PERSONNEL**

Qualifications of key construction personnel assigned to this project will be considered. More favorable evaluation ratings will be given for military construction project experience, longevity of experience at the position being proposed, and education. In addition, the proposed personnel will be reviewed to insure the requirements for that position identified in SECTION: PROPOSAL SUBMISSION REQUIREMENTS AND INSTRUCTIONS are met, and evaluation ratings will be reduced for those requirements, which are not met.

## **2.5 TAB 5 - PAST PERFORMANCE, DESIGN**

The following items will be evaluated:

Design ACASS Ratings

Performance Summary Ratings (Design)

Past Performance ratings received on prior DOD government work will be evaluated along with private sector Performance Summary Sheets (one required for each Private Industry project used as an example for “TAB 1 - Design Experience” portion of this proposal). Excellent evaluations will be evaluated more favorably than past evaluations of “Above Average”, “Average”, “Below Average”, and “Poor”. If an offeror has no past performance evaluations within the ACASS database or Performance Summary Sheets (Design) included in the proposal, a neutral evaluation will be awarded.

Higher ratings will be given for ACASS Ratings similar to those found in the Performance Summary (Design) Ratings (e.g., an “Excellent” ACASS rating will be evaluated more favorably than an “Above Average” rating from a Performance Summary Sheet). The Government may contact the raters for either the ACASS Rating or the Performance Summary Sheets. Furthermore, the government reserves the right to verify the ACASS ratings provided, as well as research the ACASS database for other ratings not provided in the proposal documents. Information furnished for each project and information received from references will affect the evaluation rating awarded.

## **2.6 TAB 6 - PAST PERFORMANCE, CONSTRUCTION**

The following items will be evaluated:

Construction CCASS Ratings

Performance Summary Ratings

Past Performance ratings received on prior DOD government work and Performance Summary Sheets (one required for each Private Industry project used as an example for “TAB 2- Construction Experience” portion of this proposal) will be evaluated. Higher evaluation ratings will be awarded for Outstanding evaluations. In descending order, lower ratings will be given for past evaluations of Above Average, Satisfactory, Marginal, and Unsatisfactory. If an offeror has no past performance evaluations within the CCASS database or Performance Summary Sheets (Construction) included in the proposal, a neutral evaluation will be awarded.

The Past Performance rating received on all CCASS ratings for the last six years, as well as all ratings received on the Performance Summary Sheets will be evaluated. Higher ratings will be given for CCASS Ratings similar to those found in the Performance Summary (Construction) Ratings (e.g., an “Above-Average” CCASS rating will be evaluated more favorably than an “Above-Average” rating from a Performance Summary Sheet). The Government may contact the raters for either the CCASS Rating or the Performance Summary Sheets. Furthermore, the government reserves the right to verify the CCASS ratings provided, as well as research the CCASS database for other ratings not provided in the proposal documents. Information furnished for each project and information received from references will affect the evaluation rating awarded.

## **2.7 TAB 7 - PROJECT MANAGEMENT PLAN (PMP)**

## CONTROL TOWER, USAF ACADEMY, CO

The quality of the offeror's plan to deliver a quality product and effectively manage the construction team and ability to effectively coordinate all work throughout the design and construction phase of this project will be evaluated. The information in the PMP should make it clear that the offeror has the ability to deliver a quality product and effectively manage the designers, consultants and subcontractors on the team, as well as the ability to coordinate all work throughout the design and construction phases. The PMP shall include an explanation of the total project team management approach for both the design team and the construction team. It shall include: management of firms included within the design team and construction team, specific quality control procedures used (including Quality Control procedures to be used to limit re-submittals, design errors, and poor coordination between the prime design firm and design consultant), schedule development, and methods to be utilized to adhere to the schedule. In addition, it should address the acquisition of environmental permits in a timely fashion, safety, preparation and submission of As-Built documents, and contract close-out. It should discuss how the design team will support the Contractor during construction and an organizational chart showing the inter-relationship of management and various team components. In addition, the PMP should address the relationship between designer and construction contractor and should clearly indicate an understanding of the design-build process. Higher evaluation ratings can be achieved with a thoroughly explained Project Management Plan suitable for the scope and complexity of this project, and which addresses each of the following:

- Management Approach
- Sub-Contractor Management
- Quality Control Procedures
- Schedule development and adherence
- Organization Chart
- Acquisition of Environmental Permits
- Safety
- Preparation and submission of As-Built documents
- Contract close-out.

### **2.8 TAB 8 - UTILIZATION OF SMALL BUSINESS CONCERNS**

See Section 00110, paragraph UTILIZATION OF SMALL BUSINESS CONCERNS for areas of evaluation.

The apparent successful offeror will be required to submit an acceptable subcontracting plan in accordance with FAR Clause 52.219.9, Small Business Subcontracting Plan. FAR Clause 52.219.9 is not applicable to small business concerns. If the apparent successful offeror fails to negotiate a subcontracting plan acceptable to the Contracting Officer within the time limit prescribed by Contracting Officer, the apparent successful offeror will be ineligible for award.

### **3. EVALUATION OF BINDER NO. 2, PRICE**

Price will be subjectively evaluated by the Government considering:

(a) Best Value: The expected outcome of an acquisition, that, in the Government's estimation, provides the greatest overall benefit in response to the requirement.

(b) Realism: Costs in an offeror's proposal are realistic for the work to be performed, reflect a clear understanding of the requirements, and are consistent with the various elements of the offeror's technical proposal.

Note that all evaluation factors other than Price, when combined, are approximately equal to the Price evaluation.

#### **4. COMPETITIVE RANGE.**

Upon completion of proposal evaluation, the Government may determine a competitive range for the purpose of conducting written discussion. The competitive range shall be determined on the basis of the factors stated in the solicitation and shall include all proposal that have a reasonable chance of being selected for award. The Government intends to award a contract on the basis of initial offers received, without discussions. Therefore, each initial offer should contain the offeror's best terms from a cost or price and technical standpoint. Notwithstanding, the Government may conduct written or oral discussion with all responsible offerors who submit proposals within the competitive range.

Offerors submitting proposals determined outside of the competitive range (lacking a reasonable chance of being selected for contract award) will be notified in writing at the earliest practicable time. In accordance with Federal Acquisition Regulation (FAR) 15.505 and 15.506, the offeror may request a preaward or postaward debriefing in writing to the Contracting Officer within three days, in accordance with clause: "SERVICE OF PROTEST", of Section 00100 INSTRUCTIONS, CONDITIONS AND NOTICES TO OFFERORS.

#### **5. FINAL PROPOSAL REVISIONS.**

If discussions are held, upon completion of discussions, the Government shall issue to all Offerors still within the competitive range a request for final proposal revisions. Following the evaluation of final proposal revisions, the Government will select the source whose final proposal revision is most advantageous, considering only the factors included in the solicitation.

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SECTION 00600  
REPRESENTATIONS, CERTIFICATIONS & OTHER STATEMENTS OF OFFERORS

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2. (FAR 52.203-11) CERTIFICATION AND DISCLOSURE REGARDING PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (APR 1991).
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SECTION 00600  
REPRESENTATIONS, CERTIFICATIONS & OTHER STATEMENTS OF OFFERORS

The bidder (offeror) makes the following certification and representations as a part of the proposal, shall check the appropriate boxes, fill in the appropriate information, and provide signatures on the attached "Solicitation Form" (00600) pages, and submit with Standard Form 1442 (Section 00010).

**1. (FAR 52.203-2) CERTIFICATE OF INDEPENDENT PRICE DETERMINATION (APR 1985).**

(a) The offeror certifies that -

(1) The prices in this offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other offeror or competitor relating to (i) those prices, (ii) the intention to submit an offer, or (iii) the methods or factors used to calculate the prices offered;

(2) the prices in this offer have not been and will not be knowingly disclosed by the offeror, directly or indirectly, to any other offeror or competitor before bid opening (in the case of a Sealed Bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) no attempt has been made or will be made by the offeror to induce any other concern to submit or not to submit an offer for the purpose of restricting competition.

(b) Each signature on the offer is considered to be a certification by the signatory that the signatory -

(1) is the person in the offeror's organization responsible for determining the prices being offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above; or

(2)(i) has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above \_\_\_\_\_

\_\_\_\_\_ [insert full name of person(s) in the offeror's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the offeror's organization];

(ii) as an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and

(iii) as an agent, has not personally participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above.

(c) If the offeror deletes or modifies subparagraph (a)(2) above, the offeror must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

**2. (FAR 52.203-11) CERTIFICATION AND DISCLOSURE REGARDING PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (APR 1991).**



(a) The definitions and prohibitions contained in the clause, at FAR 52.203-12, Limitation on Payments to Influence Certain Federal Transactions, included in this solicitation, are hereby incorporated by reference in paragraph (b) of this certification.

(b) The offeror, by signing its offer, hereby certifies to the best of his or her knowledge and belief that on or after December 23, 1989, -

(1) No Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment or modification of any Federal contract, grant, loan, or cooperative agreement;

(2) If any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with this solicitation, the offeror shall complete and submit, with its offer, OMB standard form LLL, Disclosure of Lobbying Activities, to the Contracting Officer; and

(3) He or she will include the language of this certification in all subcontract awards at any tier and require that all recipients of subcontract awards in excess of \$100,000 shall certify and disclose accordingly.

(c) Submission of this certification and disclosure is a prerequisite for making or entering into this contract imposed by section 1352, title 31, United States Code. Any person who makes an expenditure prohibited under this provision or who fails to file or amend the disclosure form to be filed or amended by this provision, shall be subject to a civil penalty of not less than \$10,000, and not more than \$100,000, for each such failure.

### **3. (FAR 52.204-3) TAXPAYER IDENTIFICATION (OCT 1998).**

(a) Definitions.

"Common parent," as used in this provision, means that corporate entity that owns or controls an affiliated group of corporations that files its Federal income tax returns on a consolidated basis, and of which the offeror is a member.

"Taxpayer Identification Number (TIN)," as used in this provision, means the number required by the Internal Revenue Service (IRS) to be used by the offeror in reporting income tax and other returns. The TIN may be either a Social Security Number or an Employer Identification Number.

(b) All offerors must submit the information required in paragraphs (d) through (f) of this provision to comply with debt collection requirements of 31 U.S.C. 7701(c) and 3325(d), reporting requirements of 26 U.S.C. 6041, 6041A, and 6050M, and implementing regulations issued by the IRS. If the resulting contract is subject to the payment reporting requirements described in Federal Acquisition Regulation (FAR) 4.904, the failure or refusal by the offeror to furnish the information may result in a 31 percent reduction of payments otherwise due under the contract.

(c) The TIN may be used by the Government to collect and report on any delinquent amounts arising out of the offeror's relationship with the Government (31 U.S.C. 7701(c)(3)). If the resulting contract is subject to the payment reporting requirements described in FAR 4.904, the TIN provided hereunder may be matched with IRS records to verify the accuracy of the offeror's TIN.

(d) Taxpayer Identification Number (TIN).

[ ] TIN: \_\_\_\_\_.

☐ TIN has been applied for.

☐ TIN is not required because:

☐ Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the United States and does not have an office or place of business or a fiscal paying agent in the United States;

☐ Offeror is an agency or instrumentality of a foreign government;

☐ Offeror is an agency or instrumentality of the Federal Government.

(e) Type of organization.

☐ Sole proprietorship;

☐ Partnership;

☐ Corporate entity (not tax-exempt);

☐ Corporate entity (tax-exempt);

☐ Government entity (Federal, State, or local);

☐ Foreign government;

☐ International organization per 26 CFR 1.6049-4;

☐ Other \_\_\_\_\_.

(f) Common parent.

☐ Offeror is not owned or controlled by a common parent as defined in paragraph (a) of this provision.

☐ Name and TIN of common parent:

Name \_\_\_\_\_

TIN \_\_\_\_\_

(End of provision)

#### **4. (FAR 52.204-5) WOMEN-OWNED BUSINESS (OTHER THAN SMALL BUSINESS)[MAY 1999]**

(a) *Definition.* Women-owned business concern, as used in this provision, means a concern that is at least 51 percent owned by one or more women; or in the case of any publicly owned business, at least 51 percent of its stock is owned by one or more women; and whose management and daily business operations are controlled by one or more women.

(b) *Representation.* [Complete only if the offeror is a women-owned business concern and has not represented itself as a small business concern in paragraph (b)(1) of FAR 52.219-1, Small Business Program Representations, of this solicitation.] The offeror represents that it ☐ is a women-owned business concern.

(End of provision)

**5. (DFARS 252.204-7001) COMMERCIAL AND GOVERNMENT ENTITY (CAGE) CODE REPORTING (AUG 1999).**

(a) The offeror is requested to enter its CAGE code on its offer in the block with its name and address. The CAGE code entered must be for that name and address. Enter "CAGE" before the number.

(b) If the Offeror does not have a CAGE code, it may ask the Contracting Officer to request one from the Defense Logistics Information Service (DLIS). The Contracting Officer will-

- (1) Ask the Contractor to complete section B of a DD Form 2051, Request for Assignment of a Commercial and Government Entity (CAGE) Code;
- (2) Complete section A and forward the form to DLIS; and
- (3) Notify the Contractor of its assigned CAGE code.

(c) Do not delay submission of the offer pending receipt of a CAGE code.

**6. (FAR 52.209-5) CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS (DEC 2001).**

(a)(1) The Offeror certifies, to the best of its knowledge and belief, that—

(i) The Offeror and/or any of its Principals—

(A) Are ☐ are not ☐ presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;

(B) Have ☐ have not ☐, within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and

(C) Are ☐ are not ☐ presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in paragraph (a)(1)(i)(B) of this provision.

(ii) The Offeror has ☐ has not ☐, within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.

(2) "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

This Certification Concerns a Matter Within the Jurisdiction of an Agency of the United States and the Making of a False, Fictitious, or Fraudulent Certification May Render the Maker Subject to Prosecution Under Section 1001, Title 18, United States Code.

(b) The Offeror shall provide immediate written notice to the Contracting Officer if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this solicitation. However, the certification will be considered in connection with a determination of the Offeror's responsibility. Failure of the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and

information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this solicitation for default. (End of Provision)

**7. (DFARS 252.209-7001) DISCLOSURE OF OWNERSHIP OR CONTROL BY A FOREIGN GOVERNMENT THAT SUPPORTS TERRORISM (MAR 1998). [For Contracts exceeding \$100,000]**

(a) Definitions.

As used in this provision-

(1) "Government of a terrorist country" includes the state and the government of a terrorist country, as well as any political subdivision, agency, or instrumentality thereof.

(2) "Terrorist country" means a country determined by the Secretary of State, under section 6(j)(1)(A)) of the Export Administration Act of 1979 (50 U.S.C. App. 2405(j)(i)(A)), to be a country the government of which has repeatedly provided support for acts of international terrorism. As of the date of this provision, terrorist countries include: Cuba, Iran, Iraq, Libya, North Korea, Sudan, and Syria.

(3) "Significant interest" means-

(i) Ownership of or beneficial interest in 5 percent or more of the firm's or subsidiary's securities. Beneficial interest includes holding 5 percent or more of any class of the firm's securities in "nominee shares," "street names," or some other method of holding securities that does not disclose the beneficial owner;

(ii) Holding a management position in the firm, such as a director or officer;

(iii) Ability to control or influence the election, appointment, or tenure of directors or officers in the firm;

(iv) Ownership of 10 percent or more of the assets of a firm such as equipment, buildings, real estate, or other tangible assets of the firm; or

(v) Holding 50 percent or more of the indebtedness of a firm.

(b) Prohibition on award. In accordance with 10 U.S.C. 2327, no contract may be awarded to a firm or a subsidiary of a firm if the government of a terrorist country has a significant interest in the firm or subsidiary [or, in the case of a subsidiary, the firm that owns the subsidiary], unless a waiver is granted by the Secretary of Defense.

(c) Disclosure.

The Offeror shall disclose any significant interest the government of each of the following countries has in the Offeror or a subsidiary of the Offeror. If the Offeror is a subsidiary, it shall also disclose any significant interest the government of a terrorist country has in any firm that owns or controls the subsidiary. The disclosure shall include--

(1) Identification of each government holding a significant interest; and

(2) A description of the significant interest held by each Government.

(End of provision)

**8. RESERVED**

**9. (FAR 52.219-1) SMALL BUSINESS PROGRAM REPRESENTATIONS (MAY 2001) ALTERNATE I (OCT 2000) ALTERNATE II (OCT 2000)**

(a) (1) The North American Industry Classification System (NAICS) code for this acquisition is \_\_\_\_\_ [insert NAICS code].

(2) The small business size standard is \$ \_\_\_\_\_ (insert size standard).

(3) The small business size standard for a concern which submits an offer in its own name, other than on a construction or service contract, but which proposes to furnish a product which it did not itself manufacture, is 500 employees.

(b) Representations. (1) The offeror represents as part of its offer that it [ ] is, [ ] is not a small business concern.

(2) *[Complete only if offeror represented itself as a small business concern in paragraph (b)(1) of this provision.]* The offeror represents, for general statistical purposes, that it [ ] is, [ ] is not, a small disadvantaged business concern as defined in 13 CFR 124.1002.

(3) *[Complete only if offeror represented itself as a small business concern in paragraph (b)(1) of this provision.]* The offeror represents as part of its offer that it [ ] is, [ ] is not a women-owned small business concern.

(4) *[Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.]* The offeror represents as part of its offer that it [ ] is, [ ] is not a veteran-owned small business concern.

(5) *[Complete only if the offeror represented itself as a veteran-owned small business concern in paragraph (b)(4) of this provision.]* The offeror represents as part of its offer that it [ ] is, [ ] is not a service-disabled veteran-owned small business concern.

(6) *[Complete only if offeror represented itself as a small business concern in paragraph (b)(1) of this provision.]* The offeror represents, as part of its offer, that—

- (i) It [ ] is, [ ] is not a HUBZone small business concern listed, on the date of this representation, on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration, and no material change in ownership and control, principal place of ownership, or HUBZone employee percentage has occurred since it was certified by the Small Business Administration in accordance with 13 CFR part 126; and
- (ii) It [ ] is, [ ] is not a joint venture that complies with the requirements of 13 CFR part 126, and the representation in paragraph (b)(6)(i) of this provision is accurate for the HUBZone small business concern or concerns that are participating in the joint venture. *[The offeror shall enter the name or names of the HUBZone small business concern or concerns that are participating in the joint venture: \_\_\_\_\_.]* Each HUBZone small business concern participating in the joint venture shall submit a separate signed copy of the HUBZone representation.

(7) *[Complete if offeror represented itself as disadvantaged in paragraph (b)(2) of this provision].* The offeror shall check the category in which its ownership falls:

\_\_\_\_\_ Black American.

\_\_\_\_\_ Hispanic American.

\_\_\_\_\_ Native American (American Indians, Eskimos, Aleuts, or Native Hawaiians).

\_\_\_\_\_ Asian-Pacific American (persons with origins from Burma, Thailand, Malaysia, Indonesia, Singapore, Brunei, Japan, China, Taiwan, Laos, Cambodia (Kampuchea), Vietnam, Korea, The Philippines, U.S. Trust Territory of the Pacific Islands (Republic of Palau), Republic of the Marshall Islands, Federated States of Micronesia, the Commonwealth of the Northern Mariana Islands, Guam, Samoa, Macao, Hong Kong, Fiji, Tonga, Kiribati, Tuvalu, or Nauru).

\_\_\_\_\_ Subcontinent Asian (Asian-Indian) American (persons with origins from India, Pakistan, Bangladesh, Sri Lanka, Bhutan, the Maldives Islands, or Nepal).

\_\_\_\_ Individual/concern, other than one of the preceding.

(c) Definitions. As used in this provision—

“Service-disabled veteran-owned small business concern”—

(1) Means a small business concern—

(i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and

(ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.

(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

“Small business concern” means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria in 13 CFR part 121 and the size standard in paragraph (a) of this provision.

“Veteran-owned small business concern” means a small business concern—

(1) Not less than 51 percent of which is owned by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and

(2) The management and daily business operations of which are controlled by one or more veterans.

“Women-owned small business concern” means a small business concern—

(1) That is at least 51 percent owned by one or more women; or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

(2) Whose management and daily business operations are controlled by one or more women.

(d) *Notice.* (1) If this solicitation is for supplies and has been set aside, in whole or in part, for small business concerns, then the clause in this solicitation providing notice of the set-aside contains restrictions on the source of the end items to be furnished.

(2) Under 15 U.S.C. 645(d), any person who misrepresents a firm's status as a small, small disadvantaged or women-owned small business concern in order to obtain a contract to be awarded under the preference programs established pursuant to sections 8(a), 8(d), 9, or 15 of the Small Business Act or any other provision of Federal law that specifically references section 8(d) for a definition of program eligibility, shall—

(i) Be punished by imposition of fine, imprisonment, or both;

(ii) Be subject to administrative remedies, including suspension and debarment; and

(iii) Be ineligible for participation in programs conducted under the authority of the Act.

## **10. RESERVED**

## **11. (FARS 52.219-19) SMALL BUSINESS CONCERN REPRESENTATION FOR THE SMALL BUSINESS COMPETITIVENESS DEMONSTRATION PROGRAM (OCT 2000).**

(a) *Definition.* “Emerging small business” as used in this solicitation, means a small business concern whose size is no greater than 50 percent of the numerical size standard applicable to the North American Industry Classification System (NAICS) code assigned to a contracting opportunity.

(b) (Complete only if Offeror has represented itself under the provision at FAR 52.219-1 as a small business concern under the size standards of this solicitation.) The Offeror [ ] is, [ ] is not an emerging small business.

(c) (Complete only if the Offeror is a small business or an emerging small business, indicating its size range.)

Offeror's number of employees for the past 12 months (check this column if size standard stated in solicitation is expressed in terms of number of employees) or Offeror's average annual gross revenue for the last 3 fiscal years (check this column if size standard stated in solicitation is expressed in terms of annual receipts). (Check one of the following.)

No. of Employees	Average Annual Gross Revenues
____ 50 or fewer	____ \$1 million or less
____ 51 - 100	____ \$1,000,001 - \$2 million
____ 101 - 250	____ \$2,000,001 - \$3.5 million
____ 251 - 500	____ \$3,500,001 - \$5 million
____ 501 - 750	____ \$5,000,001 - \$10 million
____ 751 - 1,000	____ \$10,000,001 - \$17 million
____ Over 1,000	____ Over \$17 million

**12. (FARS 52.219-21) SMALL BUSINESS SIZE REPRESENTATION FOR TARGETED INDUSTRY CATEGORIES UNDER THE SMALL BUSINESS COMPETITIVENESS DEMONSTRATION PROGRAM (MAY 1999).**

*[Complete only if the Offeror has represented itself under the provision at 52.219-1 as a small business concern under the size standards of this solicitation.]*

Offeror's number of employees for the past 12 months [*check this column if size standard stated in solicitation is expressed in terms of number of employees*] or Offeror's average annual gross revenue for the last 3 fiscal years [*check this column if size standard in solicitation is expressed in terms of annual receipts*]. [*Check one of the following.*]

NO. OF EMPLOYEES	AVERAGE ANNUAL GROSS REVENUES
____ 50 or fewer	____ \$1 million or less
____ 51 - 100	____ \$1,000,001 - \$2 million
____ 101 - 250	____ \$2,000,001 - \$3.5 million
____ 251 - 500	____ \$3,500,001 - \$5 million
____ 501 - 750	____ \$5,000,001 - \$10 million
____ 751 - 1,000	____ \$10,000,001 - \$17 million
____ Over 1,000	____ Over \$17 million

**13. (FAR 52.222-21) CERTIFICATION OF NONSEGREGATED FACILITIES (FEB 1999).**

(a) "Segregated facilities," as used in this clause, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, sex, or national origin because of written or oral policies or employee custom. The term does not include separate or single-user rest rooms or necessary dressing or sleeping areas provided to assure privacy between the sexes.

(b) The Contractor agrees that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Contractor agrees that a breach of this clause is a violation of the Equal Opportunity clause in this contract.

(c) The Contractor shall include this clause in every subcontract and purchase order that is subject to the Equal Opportunity clause of this contract.

(End of clause)

**14. (FAR 52.222-22) PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (FEB 1999).**

(a) It ☐ has, ☐ has not participated in a previous contract or subcontract subject the Equal Opportunity clause of this solicitation;

(b) It ☐ has, ☐ has not filed all required compliance reports; and

(c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

(End of provision)

**15. (FAR 52.223-4) RECOVERED MATERIAL CERTIFICATION (OCT 1997).**

As required by the Resource Conservation and Recovery Act of 1976 (42 U.S.C. 6962(c)(3)(A)(i)), the offeror certifies, by signing this offer, that the percentage of recovered materials to be used in the performance of the contract will be at least the amount required by the applicable contract specifications.

(End of provision)

**16. (FAR 52.223-13) CERTIFICATION OF TOXIC CHEMICAL RELEASE REPORTING (OCT 2000)  
[For Contracts over \$100,000]**

(a) Submission of this certification is a prerequisite for making or entering into this contract imposed by Executive Order 12969, August 8, 1995.

(b) By signing this offer, the offeror certifies that-

(1) As the owner or operator of a facilities that will be used in the performance of this contract that are subject to the filing and reporting requirements described in section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023) and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106), the offeror will file and continue to file, for such facilities for the life of the contract the Toxic Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of the EPCRA and section 6607 of PPA; or

(2) None of its owned or operated facilities to be used in the performance of this contract is subject the Form R filing and reporting requirements because each facility is exempt for at least one of the following reasons: (Check each block that is applicable.)

☐ (i) The facility does not manufacture, process or otherwise use any toxic chemicals listed under section 313(c) of EPCRA, 42 U.S.C. 11023(c);



[ ] (ii) The facility does not have 10 or more full-time employees as specified in section 313(b)(1)(A) of EPCRA, 42 U.S.C. 11023(b)(1)(A);

[ ] (iii) The facility does not meet the reporting thresholds of toxic chemicals established under section 313(f) of EPCRA, 42 U.S.C. 11023(f) (including the alternate thresholds at 40 CFR 372.27, provided an appropriate certification form has been filed with EPA);

[ ] (iv) The facility does not fall within Standard Industrial Classification Code (SIC) major groups 20 through 39 or their corresponding North American Industry Classification System (NAICS) sectors 31 through 33; or

[ ] (v) The facility is not located within any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, or any other territory or possession over which the United States has jurisdiction.

**17. (DFARS 252.225-7031) SECONDARY ARAB BOYCOTT OF ISRAEL (JUN 1992)**

(a) Definitions. As used in this clause--

(1) "Foreign person" means any person other than a United States person as defined in Section 16(2) of the Export Administration Act of 1979 (50 U.S.C. App. Sec 2415).

(2) "United States person" is defined in Section 16(2) of the Export Administration Act of 1979 and means any United States resident or national (other than an individual resident outside the United States and employed by other than a United States person), any domestic concern (including any permanent domestic establishment of any foreign concern), and any foreign subsidiary or affiliate (including any foreign establishment) of any domestic concern which is controlled in fact by such domestic concern, as determined under regulations of the President.

(b) Certification.

By submitting this offer, the Offeror, if a foreign person, company, company or entity, certifies that it--

(1) Does not comply with the Secondary Arab Boycott of Israel; and

(2) Is not taking or knowingly agreeing to take any action, with respect to the Secondary Boycott of Israel by Arab countries, which 50 U.S.C. App. Sec 2407(a) prohibits a United States person from taking.

(End of clause)

**18. (DFAR 252.247-7022) REPRESENTATION OF EXTENT OF TRANSPORTATION BY SEA (AUG 1992).**

(a) The Offeror shall indicate by checking the appropriate blank in paragraph (b) of this provision whether transportation of supplies by sea is anticipated under the resultant contract. The term "supplies" is defined in the Transportation of Supplies by Sea clause of this solicitation.

(b) REPRESENTATION. The Offeror represents that it-

\_\_\_\_\_ Does anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

\_\_\_\_\_ Does not anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

(c) Any contract resulting from this solicitation will include the Transportation of Supplies by Sea Clause. If the Offeror represents that it will not use ocean transportation, the resulting contract will also include the Defense FAR Supplement clause at 252.247-7024, Notification of Transportation of Supplies by Sea.

**19. CONTRACTOR'S CERTIFICATION (Reference FAR 4.102) (Local Provision)**

Offerors are cautioned to note the "Contractor's Certification" included in this solicitation and to furnish the information required by paragraph (b), Partnerships, and paragraph (c), Corporations, as appropriate.

(a) CONTRACT WITH INDIVIDUAL. If the resultant contract is with an individual, it shall be signed by the individual in his own name. A contract with an individual doing business as a firm shall be signed by that individual and will ordinarily take the following form.

\_\_\_\_\_ (Signed)

An individual doing business as

\_\_\_\_\_

(b) CONTRACTS WITH PARTNERSHIPS. If the resultant contract is with a partnership, it need be signed by only one partner PROVIDED the partner signing has the authority to legally bind the partnership. In addition, the following statement shall be completed:

\_\_\_\_\_ is a partnership composed of  
(Firm Name)

\_\_\_\_\_  
(List All Partners)

\_\_\_\_\_  
(Indicate if any partner is limited in partnership authority)

(c) CONTRACTS WITH CORPORATIONS. If the resultant contract is with a corporation, it shall be executed in the corporation name, followed by the word "by" after which the person who has been authorized to execute the contract on behalf of the corporation shall sign his/her name, with the designation of his/her official capacity. In addition, the following certification shall be completed:

I, \_\_\_\_\_, certify that I am the \_\_\_\_\_ of the corporation named as Contractor herein, that \_\_\_\_\_ who signed this contract on behalf of the Contractor was then \_\_\_\_\_ of said corporation, that said contract was duly for and on behalf of said corporation by authority of the governing body and is within the scope of its corporate powers.

In witness whereof, I have hereunto affixed my signature this \_\_\_\_ day of \_\_\_\_\_, 19 \_\_\_\_.

\_\_\_\_\_  
(Signature, Printed Name, Title)

(d) CONTRACT WITH JOINT VENTURES. If the resultant contract is with a joint venture, each participant shall sign and in the manner indicated above for each type of participant. In addition, to assure a single point of contact for resolution of contractual matters and payments, the following certification shall be signed by each participant in the joint venture.

The parties hereto expressly understand and agree as follows:

(1) \_\_\_\_\_  
(Name) (Title) (Company)

is the principal representative of the joint venture. As such, all communications regarding the administration of the contract and the performance of the work thereunder may be directed to him. In the absence of:

---

(Name)            (Title)            (Company as above)

---

(Name)            (Title)            (Company of Alternate)

is the alternate principle of the joint venture.

(2) Directions, approvals, required notices, and all other communications from the Government to the joint venture, including transmittal of payments by the Government, shall be directed to:

---

(Name)            (Title)            (Company)

principal representative of the joint venture.

(e) SIGNATURE OF AGENTS. If the resultant contract is signed by an agent, other than as stated above, the fact of the agency will be evidenced by a copy of the Power of Attorney.

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SECTION 00700

CONTRACT CLAUSES

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DESIGNATED PRODUCTS (AUG 2000) [For Contracts exceeding \$100,000. EPA Designated product (available  
at <http://www.epa.gov/cpg/>)]

57. \*FAR 52.223-14 TOXIC CHEMICAL RELEASE REPORTING (OCT 2000)

[For

Contracts Over \$100,000]

58. DFARS 252.223-7006 PROHIBITION ON STORAGE AND DISPOSAL OF TOXIC AND  
HAZARDOUS MATERIALS (APR 1993)

59. \*FAR 52.225-9 BUY AMERICAN ACT—BALANCE OF PAYMENT PROGRAM—CONSTRUCTION  
MATERIALS (FEB 2002) (For Contracts less than \$6.806 million)

60. \*FAR 52.225-10 NOTICE OF BUY AMERICAN ACT/BALANCE OF PAYMENTS PROGRAM  
REQUIREMENT—CONSTRUCTION MATERIALS (FEB 2000) (Applicable with FAR 52.225-9)

61. \*FAR 52.225-11 BUY AMERICAN ACT—BALANCE OF PAYMENTS PROGRAM—  
CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (FEB 2002) [For Contracts more than  
\$6,806,000] ALTERNATE I (JUNE 2000) [For Contracts between \$6.806 and 7.068419 Million]

62. \*FAR 52.225-12 NOTICE OF BUY AMERICAN ACT/BALANCE OF PAYMENTS PROGRAM  
REQUIREMENT—CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (FEB 2000) [Applicable  
with FAR 52.225-11] ALTERNATE II (June 2000) [For Contracts Between 6.806 and 7.068419 Million]

63. \*FAR 52.225-13 RESTRICTIONS ON CERTAIN FOREIGN PURCHASES (JULY 2000)

64. DFARS 252.226-7001 UTILIZATION OF INDIAN ORGANIZATIONS AND INDIAN-OWNED  
ECONOMIC ENTERPRISES--DOD CONTRACTS (SEP 2001)

65. \*FAR 52.227-1 AUTHORIZATION AND CONSENT (JUL 1995)

66. \*FAR 52.227-2 NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT (AUG 1996)
67. \*FAR 52.227-4 PATENT INDEMNITY--CONSTRUCTION CONTRACTS (APR 1984)
68. DFARS 252.227-7022 GOVERNMENT RIGHTS (UNLIMITED) (MAR 1979)
69. DFARS 252.227-7023 DRAWINGS AND OTHER DATA TO BECOME PROPERTY OF GOVERNMENT (MAR 1979)
70. DFARS 252.227-7033 RIGHTS IN SHOP DRAWINGS (APR 1966)
71. \*FAR 52.228-2 ADDITIONAL BOND SECURITY (OCT 1997)
72. \*FAR 52.228-5 INSURANCE--WORK ON A GOVERNMENT INSTALLATION (JAN 1997) [For Contracts Exceeding \$100,000]
73. \*FAR 52.228-11 PLEDGES OF ASSETS (FEB 1992)
74. \*FAR 52.228-12 PROSPECTIVE SUBCONTRACTOR REQUESTS FOR BONDS (OCT 1995)
75. FAR 52.228-14 IRREVOCABLE LETTER OF CREDIT (DEC 1999)
76. \*FAR 52.228-15 PERFORMANCE AND PAYMENT BONDS (JULY 2000)
77. FAR 52.229-3 FEDERAL, STATE, AND LOCAL TAXES (JAN 1991) [For Contracts Exceeding \$100,000]
78. FAR 52.229-5 TAXES--CONTRACTS PERFORMED IN U.S. POSSESSIONS OR PUERTO RICO (APR 1984)
79. FAR 52.230-1 COST ACCOUNTING STANDARDS NOTICES AND CERTIFICATION (JUNE 2000)
80. \*FAR 52.230-2 COST ACCOUNTING STANDARDS (APR 1998)
81. \*FAR 52.230-3 DISCLOSURE AND CONSISTENCY OF COST ACCOUNTING PRACTICES (APR 1998)
82. DFARS 252.231-7000 SUPPLEMENTAL COST PRINCIPLES (DEC 1991)
83. \*FAR 52.232-5 PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS (MAY 1997)
84. RESERVED.
85. \*FAR 52.232-10 PAYMENTS UNDER FIXED-PRICE ARCHITECT-ENGINEER CONTRACTS (AUG 1987)
86. \*FAR 52.232-17 INTEREST (JUN 1996)
87. \*FAR 52.232-23 ASSIGNMENT OF CLAIMS (JAN 1986)
88. \*FAR 52.232-26 PROMPT PAYMENT FOR FIXED-PRICE ARCHITECT-ENGINEER CONTRACTS (FEB 2002)
89. \*FAR 52.232-27 PROMPT PAY FOR CONSTRUCTION CONTRACTS (FEB 2002)
90. \*FAR 52.232-33 PAYMENT BY ELECTRONIC FUNDS TRANSFER--CENTRAL CONTRACTOR REGISTRATION (MAY 1999)
91. DFARS 252.232-7004 DOD PROGRESS PAYMENT RATES (OCT 2001)
92. DFARS 252.232-7005 REIMBURSEMENT OF SUBCONTRACTOR ADVANCE PAYMENTS--DOD PILOT MENTOR-PROTEGE PROGRAM (SEP 2001)
93. \*FAR 52.233-1 DISPUTES (DEC 1998)
94. \*FAR 52.233-11 DISPUTES (DEC 1998) ALTERNATE I (DEC 1991)
95. \*FAR 52.233-3 PROTEST AFTER AWARD (AUG 1996)
96. RESERVED.
97. FAR 52.236-2 DIFFERING SITE CONDITIONS (APR 1984)
98. \*FAR 52.236-3 SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK (APR 1984)
99. \*FAR 52.236-5 MATERIAL AND WORKMANSHIP (APR 1984)
100. \*FAR 52.236-6 SUPERINTENDENCE BY THE CONTRACTOR (APR 1984)
101. FAR 52.236-7 PERMITS AND RESPONSIBILITIES (NOV 1991)
102. \*FAR 52.236-8 OTHER CONTRACTS (APR 1984)
103. \*FAR 52.236-9 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS (APR 1984)
104. FAR 52.236-10 OPERATIONS AND STORAGE AREAS (APR 1984)
105. \*FAR 52.236-11 USE AND POSSESSION PRIOR TO COMPLETION (APR 1984)
106. \*FAR 52.236-12 CLEANING UP (APR 1984)
107. \*FAR 52.236-13 ACCIDENT PREVENTION-ALTERNATE I (NOV 1991)
108. \*FAR 52.236-14 AVAILABILITY AND USE OF UTILITY SERVICES (APR 1984)
109. FAR 52.236-15 SCHEDULES FOR CONSTRUCTION CONTRACTS (APR 1984)

110. \*FAR 52.236-17 LAYOUT OF WORK (APR 1984)
111. FAR 52.236-21 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FEB 1997)
112. \*FAR 52.236-23 RESPONSIBILITY OF THE ARCHITECT-ENGINEER CONTRACTOR (APR 1984)
113. \*FAR 52.236-24 WORK OVERSIGHT IN ARCHITECT-ENGINEER CONTRACTS (APR 1984)
114. \*FAR 52.236-25 REQUIREMENTS FOR REGISTRATION OF DESIGNERS (APR 1984)
115. \*FAR 52.236-26 PRECONSTRUCTION CONFERENCE (FEB 1995)
116. DFARS 252.236-7000 MODIFICATION OF PROPOSALS - PRICE BREAKDOWN (DEC 1991)
117. \*FAR 52.242-13 BANKRUPTCY (JUL 1995)
118. \*FAR 52.242-14 SUSPENSION OF WORK (APR 1984)
119. DFARS 252.242-7005 COST/SCHEDULE STATUS REPORT (MAR 1998)
120. \*FAR 52.243-1 CHANGES--FIXED-PRICE (AUG 1987) ALTERNATE III (AUG 1984)
121. FAR 52.243-4 CHANGES (AUG 1987)
122. DFARS 252.243-7001 PRICING OF CONTRACT MODIFICATIONS (DEC 1991)
123. DFARS 252.243-7002 REQUESTS FOR EQUITABLE ADJUSTMENT (MAR 1998)
124. \*FAR 52.244-2 SUBCONTRACTS (AUG 1998)
125. \*FAR 52.244-4 SUBCONTRACTORS AND OUTSIDE ASSOCIATES AND CONSULTANTS (ARCHITECT-ENGINEER SERVICES) (AUG 1998)
126. FAR 52.244-6 SUBCONTRACTS FOR COMMERCIAL ITEMS (MAY 2001)
127. \*FAR 52.245-2 GOVERNMENT PROPERTY (FIXED-PRICE CONTRACTS) (DEC 1989) [For Government Property over \$100,000]
128. \*FAR 52.245-4 GOVERNMENT-FURNISHED PROPERTY (SHORT FORM) (APR 1984) [For Government Property \$100,000 or Less]
129. \*FAR 52.246-12 INSPECTION OF CONSTRUCTION (AUG 1996)
130. \*FAR 52.246-21 WARRANTY OF CONSTRUCTION (MAR 1994)
131. DFARS 252.247-7023 TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)
132. DFARS 252.247-7024 NOTIFICATION OF TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)
133. ~~DELETED FAR 52.248-3 VALUE ENGINEERING--CONSTRUCTION (FEB 2000) (ALTERNATE I (APR 1984))~~
134. \*FAR 52.249-2 TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE) ALTERNATE I (SEP 1996) [For Contracts Over \$100,000]
135. \*FAR 52.249-10 DEFAULT (FIXED-PRICE CONSTRUCTION) (APR 1984)
136. ENVIRONMENTAL LITIGATION (1974 NOV OCE)
137. EFARS 52.249-5000 BASIS FOR SETTLEMENT OF PROPOSALS



SECTION 00700

CONTRACT CLAUSES

**1. FAR 52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)**

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

<http://www.arnet.gov/far>

(End of clause)

**\* - CONTRACT CLAUSES THAT MAY BE INCORPORATED BY REFERENCE**

**2. DFARS 252.201-7000 CONTRACTING OFFICER'S REPRESENTATIVE (DEC 1991)**

(a) Definition.

"Contracting officer's representative" means an individual designated in accordance with subsection 201.602-2 of the Defense Federal Acquisition Regulation Supplement and authorized in writing by the contracting officer to perform specific technical or administrative functions.

(b) If the Contracting Officer designates a contracting officer's representative (COR), the Contractor will receive a copy of the written designation. It will specify the extent of the COR's authority to act on behalf of the contracting officer. The COR is not authorized to make any commitments or changes that will affect price, quality, quantity, delivery, or any other term or condition of the contract.

(End of clause)

**3. \*FAR 52.202-1 DEFINITIONS (DEC 2001) ALTERNATE I (MAR 2001)**

a) "Agency head" or "head of the agency" means the Secretary (Attorney General, Administrator, Governor, Chairperson, or other chief official, as appropriate) of the agency, unless otherwise indicated, including any deputy or assistant chief official of the executive agency.

(b) "Commercial component" means any component that is a commercial item.

(c) "Commercial item" means—

(1) Any item, other than real property, that is of a type customarily used by the general public or by non-governmental entities for purposes other than governmental purposes, and that—

(i) Has been sold, leased, or licensed to the general public; or

(ii) Has been offered for sale, lease, or license to the general public;

(2) Any item that evolved from an item described in paragraph (c)(1) of this clause through advances in technology or performance and that is not yet available in the commercial marketplace, but will be available in the commercial marketplace in time to satisfy the delivery requirements under a Government solicitation;

(3) Any item that would satisfy a criterion expressed in paragraphs (c)(1) or (c)(2) of this clause, but for—

(i) Modifications of a type customarily available in the commercial marketplace; or

(ii) Minor modifications of a type not customarily available in the commercial

marketplace made to meet Federal Government requirements. "Minor" modifications means modifications that do not significantly alter the nongovernmental function or essential physical characteristics of an item or component, or change the purpose of a process. Factors to be considered in determining whether a modification is minor include the value and size of the modification and the comparative value and size of the final product. Dollar values and percentages may be used as guideposts, but are not conclusive evidence that a modification is minor;

(4) Any combination of items meeting the requirements of paragraphs (c)(1), (2), (3), or (5) of this clause that are of a type customarily combined and sold in combination to the general public;

(5) Installation services, maintenance services, repair services, training services, and other services if—

(i) Such services are procured for support of an item referred to in paragraph (c)(1), (2), (3), or (4) of this definition, regardless of whether such services are provided by the same source or at the same time as the item; and

(ii) The source of such services provides similar services contemporaneously to the general public under terms and conditions similar to those offered to the Federal Government

(6) Services of a type offered and sold competitively in substantial quantities in the commercial marketplace based on established catalog or market prices for specific tasks performed under standard commercial terms and conditions. This does not include services that are sold based on hourly rates without an established catalog or market price for a specific service performed. For purposes of these services—

(i) "Catalog price" means a price included in a catalog, price list, schedule, or other form that is regularly maintained by the manufacturer or vendor, is either published or otherwise available for inspection by customers, and states prices at which sales are currently, or were last, made to a significant number of buyers constituting the general public; and

(ii) "Market prices" means current prices that are established in the course of ordinary trade between buyers and sellers free to bargain and that can be substantiated through competition or from sources independent of the offerors.

(7) Any item, combination of items, or service referred to in paragraphs (c)(1) through (c)(6), notwithstanding the fact that the item, combination of items, or service is transferred between or among separate divisions, subsidiaries, or affiliates of a Contractor; or

(8) A nondevelopmental item, if the procuring agency determines the item was developed exclusively at private expense and sold in substantial quantities, on a competitive basis, to multiple State and local Governments.

(d) "Component" means any item supplied to the Government as part of an end item or of another component, except that for use in 52.225-9, and 52.225-11 see the definitions in 52.225-9(a) and 52.225-11(a).

(e) "Contracting Officer" means a person with the authority to enter into, administer, and/or terminate contracts and make related determinations and findings. The term includes certain authorized representatives of the Contracting Officer acting within the limits of their authority as delegated by the Contracting Officer.

(f) "Nondevelopmental item" means—

(1) Any previously developed item of supply used exclusively for governmental purposes by a Federal agency, a State or local government, or a foreign government with which the United States has a mutual defense cooperation agreement;

(2) Any item described in paragraph (f)(1) of this definition that requires only minor modification or modifications of a type customarily available in the commercial marketplace in order to meet the requirements of the procuring department or agency; or

(3) Any item of supply being produced that does not meet the requirements of paragraph (f)(1) or (f)(2) solely because the item is not yet in use.

(End of clause)

#### **4. \*FAR 52.203-3 GRATUITIES (APR 1984)**

(a) The right of the Contractor to proceed may be terminated by written notice if, after notice and hearing, the agency head or a designee determines that the Contractor, its agent, or another representative--

(1) Offered or gave a gratuity (e.g., an entertainment or gift) to an officer, official, or employee of the Government; and

- (2) Intended, by the gratuity, to obtain a contract or favorable treatment under a contract.
- (b) The facts supporting this determination may be reviewed by any court having lawful jurisdiction.
- (c) If this contract is terminated under paragraph (a) above, the Government is entitled--
  - (1) To pursue the same remedies as in a breach of the contract; and
  - (2) In addition to any other damages provided by law, to exemplary damages of not less than 3 nor more than 10 times the cost incurred by the Contractor in giving gratuities to the person concerned, as determined by the agency head or a designee. (This subparagraph (c)(2) is applicable only if this contract uses money appropriated to the Department of Defense.)
- (d) The rights and remedies of the Government provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

**5. \*FAR 52.203-5 COVENANT AGAINST CONTINGENT FEES (APR 1984)**

(a) The Contractor warrants that no person or agency has been employed or retained to solicit or obtain this contract upon an agreement or understanding for a contingent fee, except a bona fide employee or agency. For breach or violation of this warranty, the Government shall have the right to annul this contract without liability or, in its discretion, to deduct from the contract price or consideration, or otherwise recover, the full amount of the contingent fee.

(b) "Bona fide agency," as used in this clause, means an established commercial or selling agency, maintained by a contractor for the purpose of securing business, that neither exerts nor proposes to exert improper influence to solicit or obtain Government contracts nor holds itself out as being able to obtain any Government contract or contracts through improper influence.

"Bona fide employee," as used in this clause, means a person, employed by a contractor and subject to the contractor's supervision and control as to time, place, and manner of performance, who neither exerts nor proposes to exert improper influence to solicit or obtain Government contracts nor holds out as being able to obtain any Government contract or contracts through improper influence.

"Contingent fee," as used in this clause, means any commission, percentage, brokerage, or other fee that is contingent upon the success that a person or concern has in securing a Government contract.

"Improper influence," as used in this clause, means any influence that induces or tends to induce a Government employee or officer to give consideration or to act regarding a Government contract on any basis other than the merits of the matter.

**6. \*FAR 52.203-7 ANTI-KICKBACK PROCEDURES (JUL 1995)**

(a) Definitions.

"Kickback," as used in this clause, means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided, directly or indirectly, to any prime Contractor, prime Contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a subcontract relating to a prime contract. "Person," as used in this clause, means a corporation, partnership, business association of any kind, trust, joint-stock company, or individual.

"Prime contract," as used in this clause, means a contract or contractual action entered into by the United States for the purpose of obtaining supplies, materials, equipment, or services of any kind.

"Prime Contractor," as used in this clause, means a person who has entered into a prime contract with the United States.

"Prime Contractor employee," as used in this clause, means any officer, partner, employee, or agent of a prime Contractor.

"Subcontract," as used in this clause, means a contract or contractual action entered into by a prime Contractor or subcontractor for the purpose of obtaining supplies, materials, equipment, or services of any kind under a prime contract.

"Subcontractor," as used in this clause, (1) means any person, other than the prime Contractor, who offers to furnish or furnishes any supplies, materials, equipment, or services of any kind under a prime contract or a subcontract entered into in connection with such prime contract, and (2) includes any person who offers to furnish or furnishes general supplies to the prime Contractor or a higher tier subcontractor.

"Subcontractor employee," as used in this clause, means any officer, partner, employee, or agent of a subcontractor.

(b) The Anti-Kickback Act of 1986 (41 U.S.C. 51-58) (the Act), prohibits any person from--  
(1) Providing or attempting to provide or offering to provide any kickback;  
(2) Soliciting, accepting, or attempting to accept any kickback; or  
(3) Including, directly or indirectly, the amount of any kickback in the contract price charged by a prime Contractor to the United States or in the contract price charged by a subcontractor to a prime Contractor or higher tier subcontractor.

(c) (1) The Contractor shall have in place and follow reasonable procedures designed to prevent and detect possible violations described in paragraph (b) of this clause in its own operations and direct business relationships.

(2) When the Contractor has reasonable grounds to believe that a violation described in paragraph (b) of this clause may have occurred, the Contractor shall promptly report in writing the possible violation. Such reports shall be made to the inspector general of the contracting agency, the head of the contracting agency if the agency does not have an inspector general, or the Department of Justice.

(3) The Contractor shall cooperate fully with any Federal agency investigating a possible violation described in paragraph (b) of this clause.

(4) The Contracting Officer may  
(i) offset the amount of the kickback against any monies owed by the United States under the prime contract and/or  
(ii) direct that the Prime Contractor withhold from sums owed a subcontractor under the prime contract the amount of the kickback. The Contracting Officer may order that monies withheld under subdivision (c)(4)(ii) of this clause be paid over to the Government unless the Government has already offset those monies under subdivision (c)(4)(i) of this clause. In either case, the Prime Contractor shall notify the Contracting Officer when the monies are withheld.

(5) The Contractor agrees to incorporate the substance of this clause, including subparagraph (c)(5) but excepting subparagraph (c)(1), in all subcontracts under this contract which exceed \$100,000.

## **7. \*FAR 52.203-8 CANCELLATION, RESCISSION, AND RECOVERY OF FUNDS FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997)**

(a) If the Government receives information that a contractor or a person has engaged in conduct constituting a violation of subsection (a), (b), (c), or (d) of Section 27 of the Office of Federal Procurement Policy Act (41 U.S.C. 423) (the Act), as amended by section 4304 of the National Defense Authorization Act for Fiscal Year 1996 (Pub. L. 104-106), the Government may--

(1) Cancel the solicitation, if the contract has not yet been awarded or issued; or

(2) Rescind the contract with respect to which--

(i) The Contractor or someone acting for the Contractor has been convicted for an offense where the conduct constitutes a violation of subsection 27 (a) or (b) of the Act for the purpose of either--

(A) Exchanging the information covered by such subsections for anything of value; or

(B) Obtaining or giving anyone a competitive advantage in the award of a Federal agency procurement contract; or

(ii) The head of the contracting activity has determined, based upon a preponderance of the evidence, that the Contractor or someone acting for the Contractor has engaged in conduct constituting an offense punishable under subsection 27(e)(1) of the Act.

(b) If the Government rescinds the contract under paragraph (a) of this clause, the Government is entitled to recover, in addition to any penalty prescribed by law, the amount expended under the contract.

(c) The rights and remedies of the Government specified herein are not exclusive, and are in addition to any other rights and remedies provided by law, regulation, or under this contract.

**8. DFARS 252.203-7001 PROHIBITION ON PERSONS CONVICTED OF FRAUD OR OTHER DEFENSE—CONTRACT-RELATED FELONIES (MARCH 1999)**

- (a) Definitions.  
As used in this clause--
  - (1) "Arising out of a contract with the "DoD" means any any act in connection with--
    - (i) Attempting to obtain;
    - (ii) Obtaining; or
    - (iii) Performing a contract or first-tier subcontract of any department, or component of the Department of Defense (DoD).
  - (2) "Conviction of fraud or any other felony," means any conviction for fraud or a felony in violation of state or Federal criminal statutes, whether entered on a verdict or plea, including a plea of nolo contendere, for which sentence has been imposed.
  - (3) "Date of conviction," means the date judgement was entered against the individual.
- (b) Any individual who is convicted after September 29, 1988 of fraud or any other felony arising out of a contract with the DoD is prohibited from serving--
  - (1) In a management or supervisory capacity on any DoD contract or first-tier subcontract;
  - (2) On board of directors of any DoD Contractor or first-tier subcontractor;
  - (3) As a consultant to any DoD Contractor or first-tier subcontractor; or
  - (4) In any other capacity with the authority to influence, advise, or control the decisions of any DoD contractor or subcontractor with regard to any DoD contract or first-tier subcontract.
- (c) Unless waived, the prohibition in paragraph (b) of this clause applies for not less than five years from the date of conviction.
- (d) 10 U.S.C. 2408 provides that a defense Contractor or first-tier subcontractor shall be subject to a criminal penalty of not more than \$500,000 if convicted of knowingly--
  - (1) Employing a person under a prohibition in paragraph (b) of this clause;
  - (2) Allowing such a person to serve on the board of directors of Contractor or first-tier subcontractor.
- (e) In addition to the criminal penalties contained in 10 U.S.C. 2408, the Government may consider other available remedies, such as--
  - (1) Suspension or debarment;
  - (2) Cancellation of the contract at no cost to the Government; or
  - (3) Termination of the contract for default.
- (f) The Contractor may submit written requests for waiver of the prohibition in paragraph (b) of this clause to the Contracting Officer. Requests shall clearly identify--
  - (1) The person involved;
  - (2) The nature of the conviction and resultant sentence or punishment imposed;
  - (3) The reasons for the requested waiver; and
  - (4) An explanation of why a waiver is in the interest of national security.
- (g) The Contractor agrees to include the substance of this clause appropriately modified to reflect the identity and relationship of the parties, in all first-tier subcontracts exceeding the simplified acquisition threshold in Part 2 of the Federal Acquisition Regulation, except those for commercial items or components.
- (h) Pursuant to 10 U.S.C.2408(c), defense contractors and subcontractors may obtain information as to whether a particular has been convicted of fraud or any other felony arising out of a contract with the DoD by contracting The Office of Justice Programs, The Denial of Federal Benefits Office, U.S. Department of Justice, telephone (202) 616-3507.

**9. RESERVED**

**10. \*FAR 52.203-10 PRICE OR FEE ADJUSTMENT FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997)**

(a) The Government, at its election, may reduce the price of a fixed-price type contract and the total cost and fee under a cost-type contract of profit or fee determined as set forth in paragraph (b) of this clause if the head of the contracting activity or designee determines that there was a violation of subsection 27(a), (b), or (c) of the Office of Federal Procurement Policy Act, as amended (41 U.S.C. 423), as implemented in section 3.104 of the Federal Acquisition Regulation.

(b) The price or fee reduction referred to in paragraph (a) of this clause shall be--

(1) For cost-plus-fixed-fee contracts, the amount of the fee specified in the contract at the time of award;

(2) For cost-plus-incentive-fee contracts, the target fee specified in the contract at the time of award, notwithstanding any minimum fee or "fee floor" specified in the contract;

(3) For cost-plus-award-fee contracts--

(i) The base fee established in the contract at the time of contract award;

(ii) If no base fee is specified in the contract, 30 percent of the amount of each award fee otherwise payable to the Contractor for each award fee evaluation period or at each award fee determination point.

(4) For fixed-price-incentive contracts, the Government may--

(i) Reduce the contract target price and contract target profit both by an amount equal to the initial target profit specified in the contract at the time of contract award; or

(ii) If an immediate adjustment to the contract target price and contract target profit would have a significant adverse impact on the incentive price revision relationship under the contract, or adversely affect the contract financing provisions, the Contracting Officer may defer such adjustment until establishment of the total final price of the contract. The total final price established in accordance with the incentive price revision provisions of the contract shall be reduced by an amount equal to the initial target profit specified in the contract at the time of contract award and such reduced price shall be the total final contract price.

(5) For firm-fixed-price contracts, by 10 percent of the initial contract price or a profit amount determined by the Contracting Officer from records or documents in existence prior to the date of the contract award.

(c) The Government may, at its election, reduce a prime contractor's price or fee in accordance with the procedures of paragraph (b) of this clause for violations of the Act by its subcontractors by an amount not to exceed the amount of profit or fee reflected in the subcontract at the time the subcontract was first definitively priced.

(d) In addition to the remedies in paragraphs (a) and (c) of this clause, the Government may terminate this contract for default. The rights and remedies of the Government specified herein are not exclusive, and are in addition to any other rights and remedies provided by law or under this contract.

**11. \*FAR 52.203-12 LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (JUN 1997)**

(a) Definitions.

"Agency," as used in this clause, means executive agency as defined in 2.101.

"Covered Federal Action," as used in this clause, means any of the following Federal actions:

(1) The awarding of any Federal contract.

(2) The making of any Federal grant.

(3) The making of any Federal loan.

(4) The entering into of any cooperative agreement.

(5) The extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

"Indian tribe" and "tribal organization," as used in this clause, have the meaning provided in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B) and include Alaskan Natives.

"Influencing or attempting to influence," as used in this clause, means making, with the intent to influence, any communication to or appearance before an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any covered Federal action.

"Local government," as used in this clause, means a unit of government in a State and, if chartered, established, or otherwise recognized by a State for the performance of a governmental duty, including a local public authority, a special district, an intrastate district, a council of governments, a sponsor group representative organization, and any other instrumentality of a local government.

"Officer or employee of an agency," as used in this clause, includes the following individuals who are employed by an agency:

(1) An individual who is appointed to a position in the Government under title 5, United States Code, including a position under a temporary appointment.

(2) A member of the uniformed services, as defined in subsection 101(3), title 37, United States Code.

(3) A special Government employee, as defined in section 202, title 18, United States Code.

(4) An individual who is a member of a Federal advisory committee, as defined by the Federal Advisory Committee Act, title 5, United States Code, appendix 2.

"Person," as used in this clause, means an individual, corporation, company, association, authority, firm, partnership, society, State and local government, regardless of whether such entity is operated for profit, or not for profit. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Reasonable compensation," as used in this clause, means, with respect to a regularly employed officer or employee of any person, compensation that is consistent with the normal compensation for such officer or employee for work that is not furnished to, not funded by, or not furnished in cooperation with the Federal Government.

"Reasonable payment," as used in this clause, means, with respect to professional and other technical services, a payment in an amount that is consistent with the amount normally paid for such services in the private sector.

"Recipient," as used in this clause, includes the Contractor and all subcontractors. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Regularly employed," as used in this clause, means, with respect to an officer or employee of a person requesting or receiving a Federal contract, an officer or employee who is employed by such person for at least 130 working days within 1 year immediately preceding the date of the submission that initiates agency consideration of such person for receipt of such contract. An officer or employee who is employed by such person for less than 130 working days within 1 year immediately preceding the date of the submission that initiates agency consideration of such person shall be considered to be regularly employed as soon as he or she is employed by such person for 130 working days.

"State," as used in this clause, means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, a territory or possession of the United States, an agency or instrumentality of a State, and multi-State, regional, or interstate entity having governmental duties and powers.

(b) Prohibitions.

(1) Section 1352 of title 31, United States Code, among other things, prohibits a recipient of a Federal Contract, grant, loan, or cooperative agreement from using appropriated funds to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: The awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan; the entering into of any cooperative agreement; or the modification of any Federal contract, grant, loan, or cooperative agreement.

(2) The Act also requires Contractors to furnish a disclosure if any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a Federal contract, grant, loan, or cooperative agreement.

(3) The prohibitions of the Act do not apply under the following conditions:

(i) Agency and legislative liaison by own employees.

(A) The prohibition on the use of appropriated funds, in subparagraph (b)(1) of this clause, does not apply in the case of a payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action if the payment is for agency and legislative liaison activities not directly related to a covered Federal action.

(B) For purposes of subdivision (b)(3)(i)(A) of this clause, providing any information specifically requested by an agency or Congress is permitted at any time.

(C) The following agency and legislative liaison activities are permitted at any time where they are not related to a specific solicitation for any covered Federal action:

(1) Discussing with an agency the qualities and characteristics (including individual demonstrations) of the person's products or services, conditions or terms of sale, and service capabilities.

(2) Technical discussions and other activities regarding the application or adaptation of the person's products or services for an agency's use.

(D) The following agency and legislative liaison activities are permitted where they are prior to formal solicitation of any covered Federal action--

(1) Providing any information not specifically requested but necessary for an agency to make an informed decision about initiation of a covered Federal action;

(2) Technical discussions regarding the preparation of an unsolicited proposal prior to its official submission; and

(3) Capability presentations by persons seeking awards from an agency pursuant to the provisions of the Small Business Act, as amended by Pub. L. 95-507, and subsequent amendments.

(E) Only those services expressly authorized by subdivision (b)(3)(i)(A) of this clause are permitted under this clause.

(ii) Professional and technical services.

(A) The prohibition on the use of appropriated funds, in subparagraph (b)(1) of this clause, does not apply in the case of--

(1) A payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action, if payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action.

(2) Any reasonable payment to a person, other than an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action if the payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action. Persons other than officers or employees of a person requesting or receiving a covered Federal action include consultants and trade associations.

(B) For purposes of subdivision (b)(3)(ii)(A) of this clause, "professional and technical services" shall be limited to advice and analysis directly applying any professional or technical discipline. For example, drafting of a legal document accompanying a bid or proposal by a lawyer is allowable. Similarly, technical advice provided by an engineer on the performance or operational capability of a piece of equipment rendered directly in the negotiation of a contract is allowable. However, communications with the intent to influence made by a professional (such as a licensed lawyer) or a technical person (such as a licensed accountant) are not allowable under this section unless they provide advice and analysis directly applying their professional or technical expertise and unless the advice or analysis is rendered directly and solely in the preparation, submission or negotiation of a covered Federal action. Thus, for example, communications with the intent to influence made by a lawyer that do not provide legal advice or analysis directly and solely related to the legal aspects of his or her client's proposal, but generally advocate one proposal over another are not allowable under this section because the lawyer is not providing professional legal services. Similarly, communications with the intent to influence made by an engineer providing an engineering analysis prior to the preparation or submission of a bid or proposal are not



allowable under this section since the engineer is providing technical services but not directly in the preparation, submission or negotiation of a covered Federal action.

(C) Requirements imposed by or pursuant to law as a condition for receiving a covered Federal award include those required by law or regulation and any other requirements in the actual award documents.

(D) Only those services expressly authorized by subdivisions (b)(3)(ii)(A)(1) and (2) of this clause are permitted under this clause.

(E) The reporting requirements of FAR 3.803(a) shall not apply with respect to payments of reasonable compensation made to regularly employed officers or employees of a person.

(iii) Disclosure.

(A) The Contractor who requests or receives from an agency a Federal contract shall file with that agency a disclosure form, OMB standard form LLL, Disclosure of Lobbying Activities, if such person has made or has agreed to make any payment using nonappropriated funds (to include profits from any covered Federal action), which would be prohibited under subparagraph (b)(1) of this clause, if paid for with appropriated funds.

(B) The Contractor shall file a disclosure form at the end of each calendar quarter in which there occurs any event that materially affects the accuracy of the information contained in any disclosure form previously filed by such person under subparagraph (c)(1) of this clause. An event that materially affects the accuracy of the information reported includes--

(1) A cumulative increase of \$25,000 or more in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action; or

(2) A change in the person(s) or individual(s) influencing or attempting to influence a covered Federal action; or

(3) A change in the officer(s), employee(s), or Member(s) contacted to influence or attempt to influence a covered Federal action.

(C) The Contractor shall require the submittal of a certification, and if required, a disclosure form by any person who requests or receives any subcontract exceeding \$100,000 under the Federal contract.

(D) All subcontractor disclosure forms (but not certifications) shall be forwarded from tier to tier until received by the prime Contractor. The prime Contractor shall submit all disclosures to the Contracting Officer at the end of the calendar quarter in which the disclosure form is submitted by the subcontractor. Each subcontractor certification shall be retained in the subcontract file of the awarding Contractor.

(iv) Agreement. The Contractor agrees not to make any payment prohibited by this clause.

(v) Penalties.

(A) Any person who makes an expenditure prohibited under paragraph (a) of this clause or who fails to file or amend the disclosure form to be filed or amended by paragraph (b) of this clause shall be subject to civil penalties as provided for by 31 U.S.C. 1352. An imposition of a civil penalty does not prevent the Government from seeking any other remedy that may be applicable.

(B) Contractors may rely without liability on the representation made by their subcontractors in the certification and disclosure form.

(vi) Cost allowability. Nothing in this clause makes allowable or reasonable any costs which would otherwise be unallowable or unreasonable. Conversely, costs made specifically unallowable by the requirements in this clause will not be made allowable under any other provision.

## **12. DFARS 252.203-7002 DISPLAY OF DOD HOTLINE POSTER (DEC 1991)** **(For Military Contracts Exceeding \$5,000,000)**

(a) The Contractor shall display prominently in common work areas within business segments performing work under Department of Defense (DoD) contracts, DoD Hotline Posters prepared by DoD Office of the Inspector General.

(b) DoD Hotline Posters may be obtained from the DoD Inspector General, ATTN: Defense Hotline, 400 Army Navy Drive, Washington DC 22202-2884.

(c) The Contract need not comply with paragraph (a) of this clause if it has established a mechanism, such as a hotline, by which employees may report suspected instances of improper conduct, and instructions that encourage employees to make such reports.

**13. \*FAR 52.204-4 PRINTED OR COPIED DOUBLE-SIDED ON RECYCLED PAPER (AUG 2000)**

(a) Definitions. As used in this clause—

“Postconsumer material” means a material or finished product that has served its intended use and has been discarded for disposal or recovery, having completed its life as a consumer item. Postconsumer material is a part of the broader category of “recovered material.” For paper and paper products, postconsumer material means “postconsumer fiber” defined by the U.S. Environmental Protection Agency (EPA) as—

(1) Paper, paperboard, and fibrous materials from retail stores, office buildings, homes, and so forth, after they have passed through their end-usage as a consumer item, including: used corrugated boxes; old newspapers; old magazines; mixed waste paper; tabulating cards; and used cordage; or

(2) All paper, paperboard, and fibrous materials that enter and are collected from municipal solid waste; but not

(3) Fiber derived from printers' over-runs, converters' scrap, and over-issue publications.

“Printed or copied double-sided” means printing or reproducing a document so that information is on both sides of a sheet of paper.

“Recovered material,” for paper and paper products, is defined by EPA in its Comprehensive Procurement Guideline as “recovered fiber” and means the following materials:

(1) Postconsumer fiber; and

(2) Manufacturing wastes such as—

(i) Dry paper and paperboard waste generated after completion of the papermaking process (that is, those manufacturing operations up to and including the cutting and trimming of the paper machine reel into smaller rolls or rough sheets) including: envelope cuttings, bindery trimmings, and other paper and paperboard waste resulting from printing, cutting, forming, and other converting operations; bag, box, and carton manufacturing wastes; and butt rolls, mill wrappers, and rejected unused stock; and

(ii) Repulped finished paper and paperboard from obsolete inventories of paper and paperboard manufacturers, merchants, wholesalers, dealers, printers, converters, or others.

(b) In accordance with Section 101 of Executive Order 13101 of September 14, 1998, Greening the Government through Waste Prevention, Recycling, and Federal Acquisition, the Contractor is encouraged to submit paper documents, such as offers, letters, or reports, that are printed or copied double-sided on recycled paper that meet minimum content standards specified in Section 505 of Executive Order 13101, when not using electronic commerce methods to submit information or data to the Government.

(c) If the Contractor cannot purchase high-speed copier paper, offset paper, forms bond, computer printout paper, carbonless paper, file folders, white wove envelopes, writing and office paper, book paper, cotton fiber paper, and cover stock meeting the 30 percent postconsumer material standard for use in submitting paper documents to the Government, it should use paper containing no less than 20 percent postconsumer material. This lesser standard should be used only when paper meeting the 30 percent postconsumer material standard is not obtainable at a reasonable price or does not meet reasonable performance standards.

(End of clause)

**14. DFARS 252.204-7003 CONTROL OF GOVERNMENT PERSONNEL WORK PRODUCT (APR 1992)**

The Contractor's procedures for protecting against unauthorized disclosure of information shall not require Department of Defense employees or members of the Armed Forces to relinquish control of their work products, whether classified or not, to the Contractor.

**15. \*FAR 52.209-6 PROTECTING THE GOVERNMENTS INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT (JUL 1995)**

(a) The Government suspends or debar Contractors to protect the Government's interests. The Contractor shall not enter into any subcontract in excess of \$25,000 with a Contractor that is debarred, suspended, or proposed for debarment unless there is a compelling reason to do so.

(b) The Contractor shall require each proposed first-tier subcontractor, whose subcontract will exceed \$25,000, to disclose to the Contractor, in writing, whether as of the time of award of the subcontract, the subcontractor, or its principals, is or is not debarred, suspended, or proposed for debarment by the Federal Government.

(c) A corporate office or a designee of the Contractor shall notify the Contracting Officer, in writing, before entering into a subcontract with a party that is debarred, suspended, or proposed for debarment (see FAR 9.404 for information on the List of Parties Excluded from Procurement Programs). The notice must include the following:

- (1) The name of the subcontractor.
- (2) The Contractor's knowledge of the reasons for the subcontractor being on the List of Parties Excluded from Procurement Programs.
- (3) The compelling reason(s) for doing business with the subcontractor notwithstanding its inclusion on the List of Parties Excluded From Procurement Programs.
- (4) The systems and procedures the Contractor has established to ensure that it is fully protecting the Government's interests when dealing with such subcontractor in view of the specific basis for the party's debarment, suspension, or proposed debarment.

**16. DFARS 252.209-7004 SUBCONTRACTING WITH FIRMS THAT ARE OWNED OR CONTROLLED BY THE GOVERNMENT OF A TERRORIST COUNTRY (MAR 1998)**

(a) Unless the Government determines that there is a compelling reason to do so, the Contractor shall not enter into any subcontract in excess of \$25,000 with a firm, or a subsidiary of a firm, that is identified, on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs, as being ineligible for the award of Defense contracts or subcontracts because it is owned or controlled by the government of a terrorist country.

(b) A corporate officer or a designee of the Contractor shall notify the Contracting Officer, in writing, before entering into a subcontract with a party that is identified, on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs, as being ineligible for the award of Defense contracts or subcontracts because it is owned or controlled by the government of a terrorist country. The notice must include the name of the proposed subcontractor and the compelling reason(s) for doing business with the subcontractor notwithstanding its inclusion on the List of Parties Excluded From Federal Procurement and Nonprocurement Programs.

(End of clause)

**17. \*FAR 52.211-15 DEFENSE PRIORITY AND ALLOCATION REQUIREMENTS (SEP 1990) [For Military Contract's Only]**

This is a rated order certified for national defense use, and the Contractor shall follow all the requirements of the Defense Priorities and Allocations System regulation (15 CFR 700).

**18. ~~DELETED FAR 52.211-18~~ ————— ~~VARIATION IN ESTIMATED QUANTITY (APR 1984)~~**

~~If the quantity of a unit priced item in this contract is an estimated quantity and the actual quantity of the unit priced item varies more than 15 percent above or below the estimated quantity, an equitable adjustment in the contract price shall be made upon demand of either party. The equitable adjustment shall be based upon any increase or decrease in costs due solely to the variation above 115 percent or below 85 percent of the estimated quantity. If the quantity variation is such as to cause an increase in the time necessary for completion, the Contractor may request, in writing, an extension of time, to be received by the Contracting Officer within 10 days from the beginning of the delay, or within such further period as may be granted by the Contracting Officer before the date of final settlement of the contract. Upon the receipt of a written request for an extension, the Contracting Officer shall ascertain the facts and make an adjustment for extending the completion date as, in the judgement of the Contracting Officer, is justified.~~

**19. \*FAR 52.215-2                      AUDIT AND RECORDS-NEGOTIATION (JUNE 1999)**

(a) As used in this clause, "records" includes books, documents, accounting procedures and practices, and other data, regardless of type and regardless of whether such items are in written form, in the form of computer data, or in any other form.

(b) Examination of costs. If this is a cost-reimbursement, incentive, time-and-materials, labor-hour, or price redeterminable contract, or any combination of these, the Contractor shall maintain and the Contracting Officer, or an authorized representative of the Contracting Officer, shall have the right to examine and audit all records and other evidence sufficient to reflect properly all costs claimed to have been incurred or anticipated to be incurred directly or indirectly in performance of this contract. This right of examination shall include inspection at all reasonable times of the Contractor's plants, or parts of them, engaged in performing the contract.

(c) Cost or pricing data. If the Contractor has been required to submit cost or pricing data in connection with any pricing action relating to this contract, the Contracting Officer, or an authorized representative of the Contracting Officer, in order to evaluate the accuracy, completeness, and currency of the cost or pricing data, shall have the right to examine and audit all of the Contractor's records, including computations and projections, related to--

- (1) The proposal for the contract, subcontract, or modification;
- (2) The discussions conducted on the proposal(s), including those related to negotiating;
- (3) Pricing of the contract, subcontract, or modification; or
- (4) Performance of the contract, subcontract or modification.

(d) Comptroller General--(1) The Comptroller General of the United States, or an authorized representative, shall have access to and the right to examine any of the Contractor's directly pertinent records involving transactions related to this contract or a subcontract hereunder.

(2) This paragraph may not be construed to require the Contractor or subcontractor to create or maintain any record that the Contractor or subcontractor does not maintain in the ordinary course of business or pursuant to a provision of law.

(e) Reports. If the Contractor is required to furnish cost, funding, or performance reports, the Contracting Officer or an authorized representative of the Contracting Officer shall have the right to examine and audit the supporting records and materials, for the purpose of evaluating--

(1) The effectiveness of the Contractor's policies and procedures to produce data compatible with the objectives of these reports; and

(2) The data reported.

(f) Availability. The Contractor shall make available at its office at all reasonable times the records, materials, and other evidence described in paragraphs (a), (b), (c), (d), and (e) of this clause, for examination, audit, or reproduction, until 3 years after final payment under this contract or for any shorter period specified in Subpart 4.7, Contractor Records Retention, of the Federal Acquisition Regulation (FAR), or for any longer period required by statute or by other clauses of this contract. In addition--

(1) If this contract is completely or partially terminated, the Contractor shall make available the records relating to the work terminated until 3 years after any resulting final termination settlement; and

(2) The Contractor shall make available records relating to appeals under the Disputes clause or to litigation or the settlement of claims arising under or relating to this contract shall be made available until such appeals, litigation, or claims are finally resolved.

(g) The Contractor shall insert a clause containing all the terms of this clause, including this paragraph (g), in all subcontracts under this contract that exceed the simplified acquisition threshold, and--

(1) That are cost-reimbursement, incentive, time-and-materials, labor-hour, or price-redeterminable type or any combination of these;

(2) For which cost or pricing data are required; or

(3) That require the subcontractor to furnish reports as discussed in paragraph (e) of this clause.

The clause may be altered only as necessary to identify properly the contracting parties and the Contracting Officer under the Government prime contract.

(End of clause)

## **20. \*FAR 52.215-10 PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA (OCT 1997)**

(a) If any price, including profit or fee, negotiated in connection with this contract, or any cost reimbursable under this contract, was increased by any significant amount because--

(1) The Contractor or a subcontractor furnished cost or pricing data that were not complete, accurate, and current as certified in its Certificate of Current Cost or Pricing Data;

(2) A subcontractor or prospective subcontractor furnished the Contractor cost or pricing data that were not complete, accurate, and current as certified in the Contractor's Certificate of Current Cost or Pricing Data; or

(3) Any of these parties furnished data of any description that were not accurate, the price or cost shall be reduced accordingly and the contract shall be modified to reflect the reduction.

(b) Any reduction in the contract price under paragraph (a) of this clause due to defective data from a prospective subcontractor that was not subsequently awarded the subcontract shall be limited to the amount, plus applicable overhead and profit markup, by which--

(1) The actual subcontract; or

(2) The actual cost to the Contractor, if there was no subcontract, was less than the prospective subcontract cost estimate submitted by the Contractor; provided, that the actual subcontract price was not itself affected by defective cost or pricing data.

(c)(1) If the Contracting Officer determines under paragraph (a) of this clause that a price or cost reduction should be made, the Contractor agrees not to raise the following matters as a defense:

(i) The Contractor or subcontractor was a sole source supplier or otherwise was in a superior bargaining position and thus the price of the contract would not have been modified even if accurate, complete, and current cost or pricing data had been submitted.

(ii) The Contracting Officer should have known that the cost or pricing data in issue were defective even though the Contractor or subcontractor took no affirmative action to bring the character of the data to the attention of the Contracting Officer.

(iii) The contract was based on an agreement about the total cost of the contract and there was no agreement about the cost of each item procured under the contract.

(iv) The Contractor or subcontractor did not submit a Certificate of Current Cost or Pricing Data.

(2)(i) Except as prohibited by subdivision (c)(2)(ii) of this clause, an offset in an amount determined appropriate by the (2)(i) Except as prohibited by subdivision (c)(2)(ii) of this clause, an offset in an amount determined appropriate by the Contracting Officer based upon the facts shall be allowed against the amount of a contract price reduction if--

(A) The Contractor certifies to the Contracting Officer that, to the best of the Contractor's knowledge and belief, the Contractor is entitled to the offset in the amount requested; and

(B) The Contractor proves that the cost or pricing data were available before the "as of" date specified on its Certificate of Current Cost or Pricing Data, and that the data were not submitted before such date.

(ii) An offset shall not be allowed if--

(A) The understated data were known by the Contractor to be understated before the "as of" date specified on its Certificate of Current Cost or Pricing Data; or

(B) The Government proves that the facts demonstrate that the contract price would not have increased in the amount to be offset even if the available data had been submitted before the "as of" date specified on its Certificate of Current Cost or Pricing Data.

(d) If any reduction in the contract price under this clause reduces the price of items for which payment was made prior to the date of the modification reflecting the price reduction, the Contractor shall be liable to and shall pay the United States at the time such overpayment is repaid--

(1) Simple interest on the amount of such overpayment to be computed from the date(s) of overpayment to the Contractor to the date the Government is repaid by the Contractor at the applicable underpayment rate effective for each quarter prescribed by the Secretary of the Treasury under 26 U.S.C. 6621(a)(2); and

(2) A penalty equal to the amount of the overpayment, if the Contractor or subcontractor knowingly submitted cost or pricing data that were incomplete, inaccurate, or noncurrent.

(End of clause)

**21. \*FAR 52.215-12 SUBCONTRACTOR COST OR PRICING DATA (OCT 1997)**

(a) Before awarding any subcontract expected to exceed the threshold for submission of cost or pricing data at FAR 15.403-4, on the date of agreement on price or the date of award, whichever is later; or before pricing any subcontract modification involving a pricing adjustment expected to exceed the threshold for submission of cost or pricing data at FAR 15.403-4, the Contractor shall require the subcontractor to submit cost or pricing data (actually or by specific identification in writing), unless an exception under FAR 15.403-1 applies.

(b) The Contractor shall require the subcontractor to certify in substantially the form prescribed in FAR 15.406-2 that, to the best of its knowledge and belief, the data submitted under paragraph (a) of this clause were accurate, complete, and current as of the date of agreement on the negotiated price of the subcontract or subcontract modification.

(c) In each subcontract that exceeds the threshold for submission of cost or pricing data at FAR 15.403-4, when entered into, the Contractor shall insert either--

(1) The substance of this clause, including this paragraph (c), if paragraph (a) of this clause requires submission of cost or pricing data for the subcontract; or

(2) The substance of the clause at FAR 52.215-13, Subcontractor Cost or Pricing Data--  
Modifications.

(End of clause)

**22. \*FAR 52.215-15 PENSION ADJUSTMENTS AND ASSET REVERSIONS (DEC 1998)**

(a) The Contractor shall promptly notify the Contracting Officer in writing when it determines that it will terminate a defined-benefit pension plan or otherwise recapture such pension fund assets.

(b) For segment closings, pension plan terminations, or curtailment of benefits, the adjustment amount shall be the amount measured, assigned, and allocated in accordance with 48 CFR 9904.413-50(c)(12) for contracts and subcontracts that are subject to Cost Accounting Standards (CAS) Board rules and regulations (48 CFR Chapter 99). For contracts and subcontracts that are not subject to CAS, the adjustment amount shall be the amount measured, assigned, and allocated in accordance with 48 CFR 9904.413-50(c)(12), except the numerator of the fraction at 48 CFR 9904.413-50(c)(12)(vi) shall be the sum of the pension plan costs allocated to all non-CAS-covered contracts and subcontracts that are subject to Federal Acquisition Regulation (FAR) Subpart 31.2 or for which cost or pricing data were submitted.

(c) For all other situations where assets revert to the Contractor, or such assets are constructively received by it for any reason, the Contractor shall, at the Government's option, make a refund or give a credit to the Government for its equitable share of the gross amount withdrawn. The Government's equitable share shall reflect the Government's participation in pension costs through those contracts for which cost or pricing data were submitted or that are subject to FAR Subpart 31.2.

(d) The Contractor shall include the substance of this clause in all subcontracts under this contract that meet the applicability requirement of FAR 15.408(g).

(End of clause)

**23. \*FAR 52.215-16 FACILITIES CAPITAL COST OF MONEY (OCT 1997)**

(a) Facilities capital cost of money will be an allowable cost under the contemplated contract, if the criteria for allowability in subparagraph 31.205-10(a)(2) of the Federal Acquisition Regulation are met. One of the allowability criteria requires the prospective contractor to propose facilities capital cost of money in its offer.

(b) If the prospective Contractor does not propose this cost, the resulting contract will include the clause Waiver of Facilities Capital Cost of Money.  
(End of provision)

**24. \*FAR 52.215-17 WAIVER OF FACILITIES CAPITAL COST OF MONEY (OCT 1997)**

The Contractor did not include facilities capital cost of money as a proposed cost of this contract. Therefore, it is an unallowable cost under this contract.  
(End of clause)

**25. \*FAR 52.215-18 REVERSION OR ADJUSTMENT OF PLANS FOR POST RETIREMENT BENEFITS (PRB) OTHER THAN PENSIONS (OCT 1997)**

The Contractor shall promptly notify the Contracting Officer in writing when it determines that it will terminate or reduce a PRB plan. If PRB fund assets revert, or inure, to the Contractor or are constructively received by it under a plan termination or otherwise, the Contractor shall make a refund or give a credit to the Government for its equitable share as required by FAR 31.205-6(o)(6). The Contractor shall include the substance of this clause in all subcontracts under this contract that meet the applicability requirements of FAR 15.408(j).

(End of clause)

**26. \*FAR 52.219-4 NOTICE OF PRICE EVALUATION PREFERENCE FOR HUBZONE SMALL BUSINESS CONCERNS (JAN 1999)**

(a) *Definition.* "HUBZone small business concern," as used in this clause, means a small business concern that appears on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration.

(b) *Evaluation preference.* (1) Offers will be evaluated by adding a factor of 10 percent to the price of all offers, except—

(i) Offers from HUBZone small business concerns that have not waived the evaluation preference;

(ii) Otherwise successful offers from small business concerns;

(iii) Otherwise successful offers of eligible products under the Trade Agreements Act when the dollar threshold for application of the Act is exceeded (see 25.402 of the Federal Acquisition Regulation (FAR)); and

(iv) Otherwise successful offers where application of the factor would be inconsistent with a Memorandum of Understanding or other international agreement with a foreign government.

(2) The factor of 10 percent shall be applied on a line item basis or to any group of items on which award may be made. Other evaluation factors described in the solicitation shall be applied before application of the factor.

(3) A concern that is both a HUBZone small business concern and a small disadvantaged business concern will receive the benefit of both the HUBZone small business price evaluation preference and the small disadvantaged business price evaluation adjustment (see FAR clause 52.219-23). Each applicable price evaluation



preference or adjustment shall be calculated independently against an offeror's base offer. These individual preference amounts shall be added together to arrive at the total evaluated price for that offer.

(c) *Waiver of evaluation preference.* A HUBZone small business concern may elect to waive the evaluation preference, in which case the factor will be added to its offer for evaluation purposes. The agreements in paragraph (d) of this clause do not apply if the offeror has waived the evaluation preference.

[ ] Offeror elects to waive the evaluation preference.

(d) *Agreement.* A HUBZone small business concern agrees that in the performance of the contract, in the case of a contract for—

(1) Services (except construction), at least 50 percent of the cost of personnel for contract performance will be spent for employees of the concern or employees of other HUBZone small business concerns;

(2) Supplies (other than procurement from a nonmanufacturer of such supplies), at least 50 percent of the cost of manufacturing, excluding the cost of materials, will be performed by the concern or other HUBZone small business concerns;

(3) General construction, at least 15 percent of the cost of the contract performance incurred for personnel will be spent on the concern's employees or the employees of other HUBZone small business concerns; or

(4) Construction by special trade contractors, at least 25 percent of the cost of the contract performance incurred for personnel will be spent on the concern's employees or the employees of other HUBZone small business concerns.

(e) A HUBZone joint venture agrees that in the performance of the contract, the applicable percentage specified in paragraph (d) of this clause will be performed by the HUBZone small business participant or participants.

(f) A HUBZone small business concern nonmanufacturer agrees to furnish in performing this contract only end items manufactured or produced by HUBZone small business manufacturer concerns. This paragraph does not apply in connection with construction or service contracts.

(End of clause)

## **27. \*FAR 52.219-8**

## **UTILIZATION OF SMALL BUSINESS CONCERNS (OCT 2000)**

(a) It is the policy of the United States that small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns, small disadvantaged business concerns, and women-owned small business concerns shall have the maximum practicable opportunity to participate in performing contracts let by any Federal agency, including contracts and subcontracts for subsystems, assemblies, components, and related services for major systems. It is further the policy of the United States that its prime contractors establish procedures to ensure the timely payment of amounts due pursuant to the terms of their subcontracts with small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns, small disadvantaged business concerns, and women-owned small business concerns.

(b) The Contractor hereby agrees to carry out this policy in the awarding of subcontracts to the fullest extent consistent with efficient contract performance. The Contractor further agrees to cooperate in any studies or surveys as may be conducted by the United States Small Business Administration or the awarding agency of the United States as may be necessary to determine the extent of the Contractor's compliance with this clause.

(c) *Definitions.* As used in this contract—

“HUBZone small business concern” means a small business concern that appears on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration.

“Service-disabled veteran-owned small business concern” —

(1) Means a small business concern—

(i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and

(ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or

permanent caregiver of such veteran.

(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

“Small business concern” means a small business as defined pursuant to Section 3 of the Small Business Act and relevant regulations promulgated pursuant thereto.

“Small disadvantaged business concern” means a small business concern that represents, as part of its offer that—

(1) It has received certification as a small disadvantaged business concern consistent with 13 CFR part 124, Subpart B;

(2) No material change in disadvantaged ownership and control has occurred since its certification;

(3) Where the concern is owned by one or more individuals, the net worth of each individual upon whom the certification is based does not exceed \$750,000 after taking into account the applicable exclusions set forth at 13 CFR 124.104(c)(2); and

(4) It is identified, on the date of its representation, as a certified small disadvantaged business in the database maintained by the Small Business Administration (PRO-Net).

“Veteran-owned small business concern” means a small business concern—

(1) Not less than 51 percent of which is owned by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and

(2) The management and daily business operations of which are controlled by one or more veterans.

“Women-owned small business concern” means a small business concern—

(1) That is at least 51 percent owned by one or more women, or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

(2) Whose management and daily business operations are controlled by one or more women.

(d) Contractors acting in good faith may rely on written representations by their subcontractors regarding their status as a small business concern, a veteran-owned small business concern, a service-disabled veteran-owned small business concern, a HUBZone small business concern, a small disadvantaged business concern, or a women-owned small business concern.

(End of clause)

**28. \*FAR 52.219-9 SMALL BUSINESS SUBCONTRACTING PLAN (JAN 2002) [When Contracting By Negotiations]**

(a) This clause does not apply to small business concerns.

(b) *Definitions.* As used in this clause—

“Commercial item” means a product or service that satisfies the definition of commercial item in section 2.101 of the Federal Acquisition Regulation.

“Commercial plan” means a subcontracting plan (including goals) that covers the offeror’s fiscal year and that applies to the entire production of commercial items sold by either the entire company or a portion thereof (*e.g.*, division, plant, or product line).

“Individual contract plan” means a subcontracting plan that covers the entire contract period (including option periods), applies to a specific contract, and has goals that are based on the offeror’s planned subcontracting in support of the specific contract, except that indirect costs incurred for common or joint purposes may be allocated on a prorated basis to the contract.

“Master plan” means a subcontracting plan that contains all the required elements of an individual contract plan, except goals, and may be incorporated into individual contract plans, provided the master plan has been approved.

“Subcontract” means any agreement (other than one involving an employer-employee relationship) entered into by a Federal Government prime Contractor or subcontractor calling for supplies or services required for performance of the contract or subcontract.

(c) The offeror, upon request by the Contracting Officer, shall submit and negotiate a subcontracting plan,

where applicable, that separately addresses subcontracting with small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business concerns, small disadvantaged business, and women-owned small business concerns. If the offeror is submitting an individual contract plan, the plan must separately address subcontracting with small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns, with a separate part for the basic contract and separate parts for each option (if any). The plan shall be included in and made a part of the resultant contract. The subcontracting plan shall be negotiated within the time specified by the Contracting Officer. Failure to submit and negotiate the subcontracting plan shall make the offeror ineligible for award of a contract.

(d) The offeror's subcontracting plan shall include the following:

(1) Goals, expressed in terms of percentages of total planned subcontracting dollars, for the use of small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns as subcontractors. The offeror shall include all subcontracts that contribute to contract performance, and may include a proportionate share of products and services that are normally allocated as indirect costs.

(2) A statement of—

(i) Total dollars planned to be subcontracted for an individual contract plan; or the offeror's total projected sales, expressed in dollars, and the total value of projected subcontracts to support the sales for a commercial plan;

(ii) Total dollars planned to be subcontracted to small business concerns;

(iii) Total dollars planned to be subcontracted to veteran-owned small business concerns;

(iv) Total dollars planned to be subcontracted to service-disabled veteran-owned small business;

(v) Total dollars planned to be subcontracted to HUBZone small business concerns;

(vi) Total dollars planned to be subcontracted to small disadvantaged business concerns; and

(vii) Total dollars planned to be subcontracted to women-owned small business concerns.

(3) A description of the principal types of supplies and services to be subcontracted, and an identification of the types planned for subcontracting to—

(i) Small business concerns;

(ii) Veteran-owned small business concerns;

(iii) Service-disabled veteran-owned small business concerns;

(iv) HUBZone small business concerns;

(v) Small disadvantaged business concerns; and

(vi) Women-owned small business concerns.

(4) A description of the method used to develop the subcontracting goals in paragraph (d)(1) of this clause.

(5) A description of the method used to identify potential sources for solicitation purposes (*e.g.*, existing company source lists, the Procurement Marketing and Access Network (PRO-Net) of the Small Business Administration (SBA), veterans service organizations, the National Minority Purchasing Council Vendor Information Service, the Research and Information Division of the Minority Business Development Agency in the Department of Commerce, or small, HUBZone, small disadvantaged, and women-owned small business trade associations). A firm may rely on the information contained in PRO-Net as an accurate representation of a concern's size and ownership characteristics for the purposes of maintaining a small, veteran-owned small, service-disabled veteran-owned small, HUBZone small, small disadvantaged, and women-owned small business source list. Use of PRONet as its source list does not relieve a firm of its responsibilities (*e.g.*, outreach, assistance, counseling, or publicizing subcontracting opportunities) in this clause.

(6) A statement as to whether or not the offeror included indirect costs in establishing subcontracting goals, and a description of the method used to determine the proportionate share of indirect costs to be incurred with—

(i) Small business concerns;

(ii) Veteran-owned small business concerns;

(iii) Service-disabled veteran-owned small business concerns;

(iv) HUBZone small business concerns;

- (v) Small disadvantaged business concerns; and
- (vi) Women-owned small business concerns.

(7) The name of the individual employed by the offeror who will administer the offeror's subcontracting program, and a description of the duties of the individual.

(8) A description of the efforts the offeror will make to assure that small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns have an equitable opportunity to compete for subcontracts.

(9) Assurances that the offeror will include the clause of this contract entitled "Utilization of Small Business Concerns" in all subcontracts that offer further subcontracting opportunities, and that the offeror will require all subcontractors (except small business concerns) that receive subcontracts in excess of \$500,000 (\$1,000,000 for construction of any public facility) to adopt a subcontracting plan that complies with the requirements of this clause.

(10) Assurances that the offeror will—

(i) Cooperate in any studies or surveys as may be required;

(ii) Submit periodic reports so that the Government can determine the extent of compliance by the offeror with the subcontracting plan;

(iii) Submit Standard Form (SF) 294, Subcontracting Report for Individual Contracts, and/or SF 295, Summary Subcontract Report, in accordance with paragraph (j) of this clause. The reports shall provide information on subcontract awards to small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns, small disadvantaged business concerns, women-owned small business concerns, and Historically Black Colleges and Universities and Minority Institutions. Reporting shall be in accordance with the instructions on the forms or as provided in agency regulations.

(iv) Ensure that its subcontractors agree to submit SF 294 and SF 295.

(11) A description of the types of records that will be maintained concerning procedures that have been adopted to comply with the requirements and goals in the plan, including establishing source lists; and a description of the offeror's efforts to locate small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns and award subcontracts to them. The records shall include at least the following (on a plant-wide or company-wide basis, unless otherwise indicated):

(i) Source lists (e.g., PRO-Net), guides, and other data that identify small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns.

(ii) Organizations contacted in an attempt to locate sources that are small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, or women-owned small business concerns.

(iii) Records on each subcontract solicitation resulting in an award of more than \$100,000, indicating—

(A) Whether small business concerns were solicited and, if not, why not;

(B) Whether veteran-owned small business concerns were solicited and, if not, why not;

(C) Whether service-disabled veteran-owned small business concerns were solicited and, if not, why not;

(D) Whether HUBZone small business concerns were solicited and, if not, why not;

(E) Whether small disadvantaged business concerns were solicited and, if not, why not;

(F) Whether women-owned small business concerns were solicited and, if not, why not; and

(G) If applicable, the reason award was not made to a small business concern.

(iv) Records of any outreach efforts to contact—

(A) Trade associations;

(B) Business development organizations;

(C) Conferences and trade fairs to locate small, HUBZone small, small

disadvantaged, and women-owned small business sources; and

(D) Veterans service organizations.

(v) Records of internal guidance and encouragement provided to buyers through—

(A) Workshops, seminars, training, etc.; and

(B) Monitoring performance to evaluate compliance with the program's

requirements.

(vi) On a contract-by-contract basis, records to support award data submitted by the offeror to the Government, including the name, address, and business size of each subcontractor.

Contractors having commercial plans need not comply with this requirement.

(e) In order to effectively implement this plan to the extent consistent with efficient contract performance, the Contractor shall perform the following functions:

(1) Assist small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns by arranging solicitations, time for the preparation of bids, quantities, specifications, and delivery schedules so as to facilitate the participation by such concerns. Where the Contractor's lists of potential small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business subcontractors are excessively long, reasonable effort shall be made to give all such small business concerns an opportunity to compete over a period of time.

(2) Provide adequate and timely consideration of the potentialities of small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns in all "make-or-buy" decisions.

(3) Counsel and discuss subcontracting opportunities with representatives of small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business firms.

(4) Provide notice to subcontractors concerning penalties and remedies for misrepresentations of business status as small, veteran-owned small business, HUBZone small, small disadvantaged, or women-owned small business for the purpose of obtaining a subcontract that is to be included as part or all of a goal contained in the Contractor's subcontracting plan.

(f) A master plan on a plant or division-wide basis that contains all the elements required by paragraph (d) of this clause, except goals, may be incorporated by reference as a part of the subcontracting plan required of the offeror by this clause; provided —

(1) The master plan has been approved;

(2) The offeror ensures that the master plan is updated as necessary and provides copies of the approved master plan, including evidence of its approval, to the Contracting Officer; and

(3) Goals and any deviations from the master plan deemed necessary by the Contracting Officer to satisfy the requirements of this contract are set forth in the individual subcontracting plan.

(g) A commercial plan is the preferred type of subcontracting plan for contractors furnishing commercial items. The commercial plan shall relate to the offeror's planned subcontracting generally, for both commercial and Government business, rather than solely to the Government contract. Commercial plans are also preferred for subcontractors that provide commercial items under a prime contract, whether or not the prime contractor is supplying a commercial item.

(h) Prior compliance of the offeror with other such subcontracting plans under previous contracts will be considered by the Contracting Officer in determining the responsibility of the offeror for award of the contract.

(i) The failure of the Contractor or subcontractor to comply in good faith with—

(1) The clause of this contract entitled "Utilization Of Small Business Concerns;" or

(2) An approved plan required by this clause, shall be a material breach of the contract.

(j) The Contractor shall submit the following reports:

(1) *Standard Form 294, Subcontracting Report for Individual Contracts*. This report shall be submitted to the Contracting Officer semiannually and at contract completion. The report covers subcontract award data related to this contract. This report is not required for commercial plans.

(2) *Standard Form 295, Summary Subcontract Report*. This report encompasses all of the contracts with the awarding agency. It must be submitted semi-annually for contracts with the Department of Defense and annually for contracts with civilian agencies. If the reporting activity is covered by a commercial plan, the reporting activity must report annually all subcontract awards under that plan. All reports submitted at the close

of each fiscal year (both individual and commercial plans) shall include a breakout, in the Contractor's format, of subcontract awards, in whole dollars, to small disadvantaged business concerns by North American Industry Classification System (NAICS) Industry Subsector. For a commercial plan, the Contractor may obtain from each of its subcontractors a predominant NAICS Industry Subsector and report all awards to that subcontractor under its predominant NAICS Industry Subsector.

(End of clause)

**29. \*FAR 52.219-16**

**LIQUIDATED DAMAGES-SUBCONTRACTING PLAN (JAN 1999)**

(a) Failure to make a good faith effort to comply with the subcontracting plan, as used in this clause, means a willful or intentional failure to perform in accordance with the requirements of the subcontracting plan approved under the clause in this contract entitled "Small Business Subcontracting Plan," or willful or intentional action to frustrate the plan.

(b) Performance shall be measured by applying the percentage goals to the total actual subcontracting dollars or, if a commercial plan is involved, to the pro rata share of actual subcontracting dollars attributable to Government contracts covered by the commercial plan. If, at contract completion, or in the case of a commercial plan, at the close of the fiscal year for which the plan is applicable, the Contractor has failed to meet its subcontracting goals and the Contracting Officer decides in accordance with paragraph (c) of this clause that the Contractor failed to make a good faith effort to comply with its subcontracting plan, established in accordance with the clause in this contract entitled "Small Business Subcontracting Plan," the Contractor shall pay the Government liquidated damages in an amount stated. The amount of probable damages attributable to the Contractor's failure to comply shall be an amount equal to the actual dollar amount by which the Contractor failed to achieve each subcontract goal.

(c) Before the Contracting Officer makes a final decision that the Contractor has failed to make such good faith effort, the Contracting Officer shall give the Contractor written notice specifying the failure and permitting the Contractor to demonstrate what good faith efforts have been made and to discuss the matter. Failure to respond to the notice may be taken as an admission that no valid explanation exists. If, after consideration of all the pertinent data, the Contracting Officer finds that the Contractor failed to make a good faith effort to comply with the subcontracting plan, the Contracting Officer shall issue a final decision to that effect and require that the Contractor pay the Government liquidated damages as provided in paragraph (b) of this clause.

(d) With respect to commercial plans, the Contracting Officer who approved the plan will perform the functions of the Contracting Officer under this clause on behalf of all agencies with contracts covered by a commercial plan.

(e) The Contractor shall have the right of appeal, under the clause in this contract entitled, Disputes, from any final decision of the Contracting Officer.

(f) Liquidated damages shall be in addition to any other remedies that the Government may have.

**30. DFARS 252.219-7003**

**SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS SUBCONTRACTING PLAN (DOD CONTRACTS) (APR 1996)**

This clause supplements the Federal Acquisition Regulation 52.219-9, Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan, clause of this contract.

(a) Definitions.

"Historically black colleges and universities," as used in this clause, means institutions determined by the Secretary of Education to meet the requirements of 34 CFR Section 608.2. The term also means any nonprofit research institution that was an integral part of such a college or university before November 14, 1986.

"Minority institutions," as used in this clause, means institutions meeting the requirements of Section 1046(3) of the Higher Education Act of 1965 (20 U.S.C. 1135d-5(3)). The term also includes Hispanic-serving institutions as defined in Section 316(b)(1) of such Act (20 U.S.C. 1059c(b)(1)).

(b) Except for company or division-wide commercial products subcontracting plans, the term "small disadvantaged business," when used in the FAR 52.219-9 clause, includes historically black colleges and universities and minority institutions in addition to small disadvantaged business concerns.

(c) Work under the contract or its subcontracts shall be credited toward meeting the small disadvantaged business concern goal required by paragraph (d) of the FAR 52.219-9 clause when:

(1) It is performed on Indian lands or in joint venture with an Indian tribe or a tribally-owned corporation, and

(2) It meets the requirements of 10 U.S.C. 2323a.

(d) Subcontracts awarded to workshops approved by the Committee for Purchase from People Who are Blind or Severely Disabled (41 U.S.C. 46-48), may be counted toward the Contractor's small business subcontracting goal.

(e) A mentor firm, under the Pilot Mentor-Protege Program established under Section 831 of Pub. L. 101-510, as amended, may count toward its small disadvantaged business goal, subcontracts awarded--

(1) Protege firms which are qualified organizations employing the severely handicapped; and

(2) Former protege firms that meet the criteria in Section 831(g)(4) of Pub. L. 101-510.

(f) The master plan approval referred to in paragraph (f) of the FAR 52.219-9 clause is approval by the Contractor's cognizant contract administration activity.

(g) In those subcontracting plans which specifically identify small, small disadvantaged, and women-owned businesses, the Contractor shall notify the Administrative Contracting Officer of any substitutions of firms that are not small, small disadvantaged, or women-owned small businesses for the firms listed in the subcontracting plan. Notifications shall be in writing and shall occur within a reasonable period of time after award of the subcontract. Contractor-specified formats shall be acceptable.

### **31. DFARS 252.219-7004**

### **SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS SUBCONTRACTING PLAN (TEST PROGRAM) (JUN 1997)**

(a) Definition. "Subcontract," as used in this clause, means any agreement (other than one involving an employer-employee relationship) entered into by a Federal Government prime Contractor or subcontractor calling for supplies or services required for performance of the contract or subcontract.

(b) The Offeror's comprehensive small business subcontracting plan and its successors, which are authorized by and approved under the test program of Section 834 of Pub. L. 101-189, shall be included in and made a part of the resultant contract. Upon expulsion from the test program or expiration of the test program, the Contractor shall negotiate an individual subcontracting plan for all future contracts that meet the requirements of Section 211 of Publ. L. 95-507.

(c) The Contractor shall submit Standard Form 295, Summary Subcontract Report, in accordance with the instructions on the form, except--

(1) One copy of SF 295 and attachments shall be submitted to Director, Small and Disadvantaged Business Utilization, Office of the Deputy Under Secretary of Defense (International and Commercial Programs), 3061 Defense Pentagon, Room 2A338, Washington, DC 20301-3061; and

(2) Item 14, Remarks, shall be completed to include semi-annual cumulative--

(1) Small business, small disadvantaged business and women-owned small business goals; and

(2) Small business and small disadvantaged business goals, actual accomplishments, and percentages for each of the two designated industry categories.

(d) The failure of the Contractor or subcontractor to comply in good faith with (1) the clause of this contract entitled "Utilization of Small, Small Disadvantaged and Women-Owned Small Business Concerns," or (2) an approved plan required by this clause, shall be a material breach of the contract.

### **32. DFARS 252.219-7009**

### **SECTION 8(a) DIRECT AWARD (JUN 1998)**

(a) This contract is issued as a direct award between the contracting office and the 8(a) Contractor pursuant to the Memorandum of Understanding dated May 6, 1998, between the Small Business Administration (SBA) and the Department of Defense. Accordingly, the SBA is not a party to this contract. SBA does retain responsibility for 8(a) certification, for 8(a) eligibility determinations and related issues, and for providing counseling and assistance to the 8(a) Contractor under the 8(a) Program. The cognizant SBA district office is:

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[To be completed by the Contracting Officer at the time of award]

(b) The contracting office is responsible for administering the contract and for taking any action on behalf of the Government under the terms and conditions of the contract; provided that the contracting office shall give advance notice to the SBA before it issues a final notice terminating performance, either in whole or in part, under the contract. The contracting office also shall coordinate with the SBA prior to processing any novation agreement. The contracting office may assign contract administration functions to a contract administration office.

(c) The Contractor agrees that--

(1) It will notify the Contracting Officer, simultaneous with its notification to the SBA (as required by SBA's 8(a) regulations at 13 CFR 124.308), when the owner or owners upon whom 8(a) eligibility is based plan to relinquish ownership or control of the concern. Consistent with Section 407 of Pub. L. 100-656, transfer of ownership or control shall result in termination of the contract for convenience, unless the SBA waives the requirement for termination prior to the actual relinquishing of ownership and control; and

(2) It will not subcontract the performance of any of the requirements of this contract without the prior written approval of the SBA and the Contracting Officer.

(End of clause)

**33. DFARS 252.219-7010 ALTERNATE A (JUN 1998)**  
**[When Competitive 8(a) Contracting Procedures are used]**

As prescribed in 219.811-3(2), substitute the following paragraph (c) for paragraph (c) of the clause at FAR 52.219-18:

(c) Any award resulting from this solicitation will be made directly by the Contracting Officer to the successful 8(a) offeror selected through the evaluation criteria set forth in this solicitation.

**34. \*FAR 52.222-1 NOTICE TO THE GOVERNMENT OF LABOR DISPUTES (FEB 1997)**

If the Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay the timely performance of this contract, the Contractor shall immediately give notice, including all relevant information, to the Contracting Officer. (End of clause)



**35. \*FAR 52.222-3**

**CONVICT LABOR (AUG 1996)**

The Contractor agrees not to employ in the performance of this contract any person undergoing a sentence of imprisonment which has been imposed by any court of a State, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, or the Trust Territory of the Pacific Islands. This limitation, however, shall not prohibit the employment by the Contractor in the performance of this contract of persons on parole or probation to work at paid employment during the term of their sentence or persons who have been pardoned or who have served their terms. Nor shall it prohibit the employment by the Contractor in the performance of this contract of persons confined for violation of the laws of any of the States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, or the Trust Territory of the Pacific Islands who are authorized to work at paid employment in the community under the laws of such jurisdiction, if--

- (a) (1) The worker is paid or is in an approved work training program on a voluntary basis;
- (2) Representatives of local union central bodies or similar labor union organizations have been consulted;
- (3) Such paid employment will not result in the displacement of employed workers, or be applied in skills, crafts, or trades in which there is a surplus of available gainful labor in the locality, or impair existing contracts for services; and
- (4) The rates of pay and other conditions of employment will not be less than those paid or provided for work of a similar nature in the locality in which the work is being performed; and
- (b) The Attorney General of the United States has certified that the work-release laws or regulations of the jurisdiction involved are in conformity with the requirements of Executive Order 11755, as amended by Executive Orders 12608 and 12943.

**36. \*FAR 52.222-4**

**CONTRACT WORK HOURS AND SAFETY STANDARDS ACT—  
OVERTIME COMPENSATION (SEPT 2000)**

(a) *Overtime requirements.* No Contractor or subcontractor employing laborers or mechanics (see Federal Acquisition Regulation 22.300) shall require or permit them to work over 40 hours in any workweek unless they are paid at least 1 and 1/2 times the basic rate of pay for each hour worked over 40 hours.

(b) *Violation; liability for unpaid wages; liquidated damages.* The responsible Contractor and subcontractor are liable for unpaid wages if they violate the terms in paragraph (a) of this clause. In addition, the Contractor and subcontractor are liable for liquidated damages payable to the Government. The Contracting Officer will assess liquidated damages at the rate of \$10 per affected employee for each calendar day on which the employer required or permitted the employee to work in excess of the standard workweek of 40 hours without paying overtime wages required by the Contract Work Hours and Safety Standards Act.

(c) *Withholding for unpaid wages and liquidated damages.* The Contracting Officer will withhold from payments due under the contract sufficient funds required to satisfy any Contractor or subcontractor liabilities for unpaid wages and liquidated damages. If amounts withheld under the contract are insufficient to satisfy Contractor or subcontractor liabilities, the Contracting Officer will withhold payments from other Federal or Federally assisted contracts held by the same Contractor that are subject to the Contract Work Hours and Safety Standards Act.

(d) *Payrolls and basic records.* (1) The Contractor and its subcontractors shall maintain payrolls and basic payroll records for all laborers and mechanics working on the contract during the contract and shall make them available to the Government until 3 years after contract completion. The records shall contain the name and address of each employee, social security number, labor classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. The records need not duplicate those required for construction work by Department of Labor regulations at 29 CFR 5.5(a)(3) implementing the Davis-Bacon Act .

(2) The Contractor and its subcontractors shall allow authorized representatives of the Contracting Officer or the Department of Labor to inspect, copy, or transcribe records maintained under paragraph (d)(1) of this clause. The Contractor or subcontractor also shall allow authorized representatives of the Contracting Officer or Department of Labor to interview employees in the workplace during working hours.

(e) *Subcontracts.* The Contractor shall insert the provisions set forth in paragraphs (a) through (d) of this clause in subcontracts exceeding \$100,000 and require subcontractors to include these provisions in any lower-tier subcontracts. The Contractor shall be responsible for compliance by any subcontractor or lower-tier subcontractor with the provisions set forth in paragraphs (a) through (d) of this clause.

(End of clause)

(a) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (d) of this clause; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such period. Such laborers and mechanics shall be paid not less than the appropriate wage rate and fringe benefits in the wage determination for the classification of work actually performed, without regard to skill, except as provided in the clause entitled Apprentices and Trainees. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein; provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph (b) of this clause) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(b) (1) The Contracting Officer shall require that any class of laborers or mechanics, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The Contracting Officer shall approve an additional classification and wage rate and fringe benefits therefor only when all the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination.

(ii) The classification is utilized in the area by the construction industry.

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the Contractor and laborers and mechanics to be employed in the classification (if known), or their representatives, and the Contracting Officer agree on the classification and wage rate (including the amount designated for fringe benefits, where appropriate), a report of the action taken shall be sent by the Contracting Officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator or an authorized representative will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary.

(3) In the event the Contractor, the laborers or mechanics to be employed in the classification, or their representatives, and the Contracting Officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the Contracting Officer shall refer the questions, including the views of all interested parties and the recommendation of the Contracting Officer, to the Administrator of the Wage and Hour Division for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits, where appropriate) determined pursuant to subparagraphs (b)(2) and (b)(3) of this clause shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(c) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(d) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program; provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of

Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

**38. \*FAR 52.222-7**

**WITHHOLDING OF FUNDS (FEB 1988)**

The Contracting Officer shall, upon his or her own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same Prime Contractor, or any other Federally assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same Prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the Contracting Officer may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

**39. \*FAR 52.222-8**

**PAYROLLS AND BASIC RECORDS (FEB 1988)**

(a) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of 3 years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of Labor has found, under paragraph (d) of the clause entitled Davis-Bacon Act, that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(b) (1) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Contracting Officer. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under paragraph (a) of this clause. This information may be submitted in any form desired. Optional Form WH-347 (Federal Stock Number 029-005-00014-1) is available for this purpose and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. The Prime Contractor is responsible for the submission of copies of payrolls by all subcontractors.

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify--

(i) That the payroll for the payroll period contains the information required to be maintained under paragraph (a) of this clause and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR Part 3; and

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph (b)(2) of this clause.

(4) The falsification of any of the certifications in this clause may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.

(c) The Contractor or subcontractor shall make the records required under paragraph (a) of this clause available for inspection, copying, or transcription by the Contracting Officer or authorized representatives of the Contracting Officer or the Department of Labor. The Contractor or subcontractor shall permit the Contracting Officer or representatives of the Contracting Officer or the Department of Labor to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit required records or to make them available, the Contracting Officer may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

#### **40. \*FAR 52.222-9**

#### **APPRENTICES AND TRAINEES (FEB 1988)**

(a) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in this paragraph, shall be paid not less than the applicable wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a Contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the Contractor will not longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(b) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed in the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the

corresponding journeyman wage rate in the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate in the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate in the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(c) Equal employment opportunity. The utilization of apprentices, trainees, and journeymen under this clause shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

**41. \*FAR 52.222-10 COMPLIANCE WITH COPELAND ACT REQUIREMENTS (FEB 1988)**

The Contractor shall comply with the requirements of 29 CFR Part 3, which are hereby incorporated by reference in this contract.

**42. \*FAR 52.222-11 SUBCONTRACTS (LABOR STANDARDS) (FEB 1988)**

(a) The Contractor or subcontractor shall insert in any subcontracts the clauses entitled Davis-Bacon Act, Contract Work Hours and Safety Standards Act--Overtime Compensation, Apprentices and Trainees, Payrolls and Basic Records, Compliance with Copeland Act Requirements, Withholding of Funds, Subcontracts (Labor Standards), Contract Termination--Debarment, Disputes Concerning Labor Standards, Compliance with Davis-Bacon and Related Act Regulations, and Certification of Eligibility, and such other clauses as the Contracting Officer may, by appropriate instructions, require, and also a clause requiring subcontractors to include these clauses in any lower tier subcontracts. The Prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with all the contract clauses cited in this paragraph.

(b) (1) Within 14 days after award of the contract, the Contractor shall deliver to the Contracting Officer a completed Statement and Acknowledgment Form (SF 1413) for each subcontract, including the subcontractor's signed and dated acknowledgment that the clauses set forth in paragraph (a) of this clause have been included in the subcontract.

(2) Within 14 days after the award of any subsequently awarded subcontract the Contractor shall deliver to the Contracting Officer an updated completed SF 1413 for such additional subcontract.

**43. \*FAR 52.222-12 CONTRACT TERMINATION--DEBARMENT (FEB 1988)**

A breach of the contract clauses entitled Davis-Bacon Act, Contract Work Hours and Safety Standards Act--Overtime Compensation, Apprentices and Trainees, Payrolls and Basic Records, Compliance with Copeland Act Requirements, Subcontracts (Labor Standards), Compliance with Davis-Bacon and Related Act Regulations, or Certification of Eligibility may be grounds for termination of the contract, and for debarment as a Contractor and subcontractor as provided in 29 CFR 5.12.

**44. \*FAR 52.222-13 COMPLIANCE WITH DAVIS-BACON AND RELATED ACT REGULATIONS (FEB 1988)**

All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are hereby incorporated by reference in this contract.

**45. \*FAR 52.222-14 DISPUTES CONCERNING LABOR STANDARDS (FEB 1988)**

The United States Department of Labor has set forth in 29 CFR Parts 5, 6, and 7 procedures for resolving disputes concerning labor standards requirements. Such disputes shall be resolved in accordance with those procedures and not the Disputes clause of this contract. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency the U.S. Department of Labor, or the employees of their representatives.

**46. \*FAR 52.222-15 CERTIFICATION OF ELIGIBILITY (FEB 1988)**

(a) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(b) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(c) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

**47. \*FAR 52.222-26 EQUAL OPPORTUNITY (FEB 1999)**

(a) If, during any 12-month period (including the 12 months preceding the award of this contract), the Contractor has been or is awarded nonexempt Federal contracts and/or subcontracts that have an aggregate value in excess of \$10,000, the Contractor shall comply with subparagraphs (b)(1) through (11) of this clause. Upon request, the Contractor shall provide information necessary to determine the applicability of this clause.

(b) During performing this contract, the Contractor agrees as follows:

(1) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. However, it shall not be a violation of this clause for the Contractor to extend a publicly announced preference in employment to Indians living on or near an Indian reservation, in connection with employment opportunities on or near an Indian reservation, as permitted by 41 CFR 60-1.5.

(2) The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. This shall include, but not be limited to, (i) employment, (ii) upgrading, (iii) demotion, (iv) transfer, (v) recruitment or recruitment advertising, (vi) layoff or termination, (vii) rates of pay or other forms of compensation, and (viii) selection for training, including apprenticeship.

(3) The Contractor shall post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer that explain this clause.

(4) The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(5) The Contractor shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, the notice to be provided by the Contracting Officer advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.

(6) The Contractor shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.

(7) The Contractor shall furnish to the contracting agency all information required by Executive Order 11246, as amended, and by the rules, regulations, and orders of the Secretary of Labor. The Contractor shall also file Standard Form 100 (EEO-1), or any successor form, as prescribed in 41 CFR part 60-1. Unless the Contractor has filed within the 12 months preceding the date of contract award, the Contractor shall, within 30 days after contract award, apply to either the regional Office of Federal Contract Compliance Programs (OFCCP) or the local office of the Equal Employment Opportunity Commission for the necessary forms.

(8) The Contractor shall permit access to its premises, during normal business hours, by the contracting agency or the OFCCP for the purpose of conducting on-site compliance evaluations and complaint investigations. The Contractor shall permit the Government to inspect and copy any books, accounts, records (including computerized records), and other material that may be relevant to the matter under investigation and pertinent to compliance with Executive Order 11246, as amended, and rules and regulations that implement the Executive Order.

(9) If the OFCCP determines that the Contractor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts, under the procedures authorized in Executive Order 11246, as amended. In addition, sanctions may be imposed and remedies invoked against the Contractor as provided in Executive Order 11246, as amended; in the the rules, regulations, and orders of the Secretary of Labor; or as otherwise provided by law.

(10) The Contractor shall include the terms and conditions of subparagraph (b)(1) through (11) of this clause in every subcontract or purchase order that is not exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor.

(11) The Contractor shall take such action with respect to any subcontract or purchase order as the Contracting Officer may direct as a means of enforcing these terms and conditions ,including sanctions for noncompliance; provided, that if the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of any direction, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

(c) Notwithstanding any other clause in this contract, disputes relative to this clause will be governed by the procedures in 41 CFR 60-1.1.

#### **48. \*FAR 52.222-27 AFFIRMATIVE ACTION COMPLIANCE REQUIREMENTS FOR CONSTRUCTION (FEB 1999)**

(a) Definitions.

"Covered area," as used in this clause, means the geographical area described in the solicitation for this contract.

"Deputy Assistant Secretary," as used in this clause, means the Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, or a designee

"Employer's identification number," as used in this clause, means the Federal Social Security number used on the employer's quarterly Federal tax return, U.S. Treasury Department Form 941.

"Minority," as used in this clause, means--

(1) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

(2) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands);

(3) Black (all persons having origins in any of the black African racial groups not of Hispanic origin); and

(4) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race).

(b) If the Contractor, or a subcontractor at any tier, subcontracts a portion of the work involving any construction trade each such subcontract in excess of \$10,000 shall include this clause and the Notice containing the goals for minority and female participation stated in the solicitation for this contract.

(c) If the Contractor is participating in a Hometown Plan (41 CFR 60-4) approved by the U.S. Department of Labor in a covered area, either individually or through an association, its affirmative actin obligations on all work in the plan area (including goals) shall comply with the plan for those trades that have unions participating in the plan. Contractors must be able to demonstrate participation in, and compliance with, the provisions of the plan. Each Contractor or subcontractor participating in an approved plan is also required to comply with its obligations under the Equal Opportunity clause, and to make a good faith effort to achieve each goal

under the plan in each trade in which it has employees. The overall good-faith performance by other Contractors or subcontractors toward a goal in an approved plan does not excuse any Contractor's or subcontractor's failure to make good-faith efforts to achieve the plan's goals.

(d) The Contractor shall implement the affirmative action procedures in subparagraphs (g)(1) through (16) of this clause. The goals stated in the solicitation for this contract are expressed as percentages of the total hours of employment and training of minority and female utilization that the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for the geographical area where that work is actually performed. The Contractor is expected to make substantially uniform progress toward its goals in each craft.

(e) Neither the terms and conditions of any collective bargaining agreement, nor the failure by a union with which the Contractor has a collective bargaining agreement, to refer minorities or women shall excuse the Contractor's obligations under this clause, Executive Order 11246, as amended, or the regulations thereunder.

(f) In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

(g) The Contractor shall take affirmative action to ensure equal employment opportunity. The evaluation of the Contractor's compliance with this clause shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully and implement affirmative action steps at least as extensive as the following:

(1) Ensure a working environment free of harassment, intimidation, and coercion at all sites and in all facilities where the Contractor's employees are assigned to work. The Contractor, if possible, will assign two or more women to each construction project. The Contractor shall ensure that foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at these sites or facilities.

(2) Establish and maintain a current list of sources for minority and female recruitment. Provide written notification to minority and female recruitment sources and community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

(3) Establish and maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant, referrals of minorities or females from unions, recruitment sources, or community organizations, and the action taken with respect to each individual. If an individual was sent to the union hiring hall for referral and not referred back to the Contractor by the union or, if referred back, not employed by the Contractor, this shall be documented in the file, along with whatever additional actions the Contractor may have taken.

(4) Immediately notify the Deputy Assistant Secretary when the union or unions with which the Contractor has a collective bargaining agreement has not referred back to the Contractor a minority or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

(5) Develop on-the-job training opportunities and/or participate in training programs for the area that expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under subparagraph (g)(2) of this clause.

(6) Disseminate the Contractor's equal employment policy by--  
(i) Providing notice of the policy to unions and to training, recruitment, and outreach programs, and requesting their cooperation in assisting the Contractor in meeting its contract obligations;  
(ii) Including the policy in any policy manual and in collective bargaining agreements;  
(iii) Publicizing the policy in the company newspaper, annual report, etc.;  
(iv) Reviewing the policy with all management personnel and with all minority and female employees at least once a year; and



(v) Posting the policy on bulletin boards accessible to employees at each location where construction work is performed.

(7) Review, at least annually, the Contractor's equal employment policy and affirmative action obligations with all employees having responsibility for hiring, assignment, layoff, termination, or other employment decisions. Conduct review of this policy with all on-site supervisory personnel before initiating construction work at a job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

(8) Disseminate the Contractor's equal employment policy externally by including it in any advertising in the news media, specifically including minority and female news media. Provide written notification to, and discuss this policy with, other Contractors and subcontractors with which the Contractor does or anticipates doing business.

(9) Direct recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students, and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than 1 month before the date for acceptance of applications for apprenticeship or training by any recruitment source, send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

(10) Encourage present minority and female employees to recruit minority persons and women. Where reasonable, provide after-school, summer, and vacation employment to minority and female youth both on the site and in other areas of the Contractor's workforce.

(11) Validate all tests and other selection requirements where required under 41 CFR 60-3.

(12) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities. Encourage these employees to seek or to prepare for, through appropriate training, etc., opportunities for promotion.

(13) Ensure that seniority practices job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment-related activities to ensure that the Contractor's obligations under this contract are being carried out.

(14) Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

(15) Maintain a record of solicitations for subcontracts for minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

(16) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's equal employment policy and affirmative action obligations.

(h) The Contractor is encouraged to participate in voluntary associations that may assist in fulfilling one or more of the affirmative action obligations contained in subparagraphs (g)(1) through (16) of this clause. The efforts of a contractor association, joint contractor-union, contractor-community, or similar group of which the contractor is a member and participant may be asserted as fulfilling one or more of its obligations under subparagraphs (g)(1) through (16) of this clause, provided the Contractor--

(1) Actively participates in the group;

(2) Makes every effort to ensure that the group has a positive impact on the employment of minorities and women in the industry;

(3) Ensures that concrete benefits of the program are reflected in the Contractor's minority and female workforce participation;

(4) Makes a good-faith effort to meet its individual goals and timetables; and

(5) Can provide access to documentation that demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply is the Contractor's, and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

(i) A single goal for minorities and a separate single goal for women shall be established. The Contractor is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and nonminority. Consequently, the Contractor may be in violation of Executive Order 11246, as amended, if a particular group is employed in a substantially disparate manner.

(j) The Contractor shall not use goals or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

(k) The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts under Executive Order 11246, as amended.

(l) The Contractor shall carry out such sanctions and penalties for violation of this clause and of the Equal Opportunity clause, including suspension, termination, and cancellation of existing subcontracts, as may be imposed or ordered under Executive Order 11246, as amended, and its implementing regulations, by the OFCCP. Any failure to carry out these sanctions and penalties as ordered shall be a violation of this clause and Executive Order 11246, as amended.

(m) The Contractor in fulfilling its obligations under this clause shall implement affirmative action procedures at least as extensive as those prescribed in paragraph (g) of this clause, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of Executive Order 11246, as amended, the implementing regulations, or this clause, the Deputy Assistant Secretary shall take action as prescribed in 41 CFR 60-4.8.

(n) The Contractor shall designate a responsible official to--

(1) Monitor all employment-related activity to ensure that the Contractor's equal employment policy is being carried out;

(2) Submit reports as may be required by the Government; and

(3) Keep records that shall at least include for each employee the name, address, telephone number, construction trade, union affiliation (if any), employee identification number, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, separate records are not required to be maintained.

(o) Nothing contained herein shall be construed as a limitation upon the application of other laws that establish different standards of compliance or upon the requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

#### **49. \*FAR 52.222-35 EQUAL OPPORTUNITY FOR SPECIAL DISABLED VETERANS, VETERANS OF THE VIETNAM ERA, AND OTHER ELIGIBLE VETERANS (DEC 2001)**

(a) *Definitions.* As used in this clause—

“All employment openings” means all positions except executive and top management, those positions that will be filled from within the Contractor's organization, and positions lasting 3 days or less. This term includes full-time employment, temporary employment of more than 3 days duration, and part-time employment.

“Executive and top management” means any employee—

(1) Whose primary duty consists of the management of the enterprise in which the individual is employed or of a customarily recognized department or subdivision thereof;

(2) Who customarily and regularly directs the work of two or more other employees;

(3) Who has the authority to hire or fire other employees or whose suggestions and recommendations as to the hiring or firing and as to the advancement and promotion or any other change of status of other employees will be given particular weight;

(4) Who customarily and regularly exercises discretionary powers; and

(5) Who does not devote more than 20 percent or, in the case of an employee of a retail or service establishment, who does not devote more than 40 percent of total hours of work in the work week to activities that are not directly and closely related to the performance of the work described in paragraphs

(1) through (4) of this definition. This paragraph (5) does not apply in the case of an employee who is in sole charge of an establishment or a physically separated branch establishment, or who owns at least a 20 percent interest in the enterprise in which the individual is employed.

“Other eligible veteran” means any other veteran who served on active duty during a war or in a campaign or expedition for which a campaign badge has been authorized.

“Positions that will be filled from within the Contractor's organization” means employment openings for

which the Contractor will give no consideration to persons outside the Contractor's organization (including any affiliates, subsidiaries, and parent companies) and includes any openings the Contractor proposes to fill from regularly established "recall" lists. The exception does not apply to a particular opening once an employer decides to consider applicants outside of its organization.

"Qualified special disabled veteran" means a special disabled veteran who satisfies the requisite skill, experience, education, and other job-related requirements of the employment position such veteran holds or desires, and who, with or without reasonable accommodation, can perform the essential functions of such position.

"Special disabled veteran" means—

(1) A veteran who is entitled to compensation (or who but for the receipt of military retired pay would be entitled to compensation) under laws administered by the Department of Veterans Affairs for a disability—

(i) Rated at 30 percent or more; or

(ii) Rated at 10 or 20 percent in the case of a veteran who has been determined under 38 U.S.C. 3106 to have a serious employment handicap (*i.e.*, a significant impairment of the veteran's ability to prepare for, obtain, or retain employment consistent with the veteran's abilities, aptitudes, and interests); or

(2) A person who was discharged or released from active duty because of a service-connected disability.

"Veteran of the Vietnam era" means a person who—

(1) Served on active duty for a period of more than 180 days and was discharged or released from active duty with other than a dishonorable discharge, if any part of such active duty occurred—

(i) In the Republic of Vietnam between February 28, 1961, and May 7, 1975; or

(ii) Between August 5, 1964, and May 7, 1975, in all other cases; or

(2) Was discharged or released from active duty for a service-connected disability if any part of the active duty was performed—

(i) In the Republic of Vietnam between February 28, 1961, and May 7, 1975; or

(ii) Between August 5, 1964, and May 7, 1975, in all other cases.

(b) *General.* (1) The Contractor shall not discriminate against the individual because the individual is a special disabled veteran, a veteran of the Vietnam era, or other eligible veteran, regarding any position for which the employee or applicant for employment is qualified. The Contractor shall take affirmative action to employ, advance in employment, and otherwise treat qualified special disabled veterans, veterans of the Vietnam era, and other eligible veterans without discrimination based upon their disability or veterans' status in all employment practices such as—

(i) Recruitment, advertising, and job application procedures;

(ii) Hiring, upgrading, promotion, award of tenure, demotion, transfer, layoff, termination, right of return from layoff and rehiring;

(iii) Rate of pay or any other form of compensation and changes in compensation;

(iv) Job assignments, job classifications, organizational structures, position descriptions, lines of progression, and seniority lists;

(v) Leaves of absence, sick leave, or any other leave;

(vi) Fringe benefits available by virtue of employment, whether or not administered by the Contractor;

(vii) Selection and financial support for training, including apprenticeship, and on-the-job training under 38 U.S.C. 3687, professional meetings, conferences, and other related activities, and selection for leaves of absence to pursue training;

(viii) Activities sponsored by the Contractor including social or recreational programs; and

(ix) Any other term, condition, or privilege of employment.

(2) The Contractor shall comply with the rules, regulations, and relevant orders of the Secretary of Labor issued under the Vietnam Era Veterans' Readjustment Assistance Act of 1972 (the Act), as amended (38 U.S.C. 4211 and 4212).

(c) *Listing openings.* (1) The Contractor shall immediately list all employment openings that exist at the time of the execution of this contract and those which occur during the performance of this contract, including those not generated by this contract, and including those occurring at an establishment of the Contractor other than the one where the contract is being performed, but excluding those of independently operated corporate affiliates, at an

appropriate local public employment service office of the State wherein the opening occurs. Listing employment openings with the U.S. Department of Labor's America's Job Bank shall satisfy the requirement to list jobs with the local employment service office.

(2) The Contractor shall make the listing of employment openings with the local employment service office at least concurrently with using any other recruitment source or effort and shall involve the normal obligations of placing a bona fide job order, including accepting referrals of veterans and nonveterans. This listing of employment openings does not require hiring any particular job applicant or hiring from any particular group of job applicants and is not intended to relieve the Contractor from any requirements of Executive orders or regulations concerning nondiscrimination in employment.

(3) Whenever the Contractor becomes contractually bound to the listing terms of this clause, it shall advise the State public employment agency in each State where it has establishments of the name and location of each hiring location in the State. As long as the Contractor is contractually bound to these terms and has so advised the State agency, it need not advise the State agency of subsequent contracts. The Contractor may advise the State agency when it is no longer bound by this contract clause.

(d) *Applicability*. This clause does not apply to the listing of employment openings that occur and are filled outside the 50 States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, American Samoa, Guam, the Virgin Islands of the United States, and Wake Island.

(e) *Postings*. (1) The Contractor shall post employment notices in conspicuous places that are available to employees and applicants for employment.

(2) The employment notices shall—

(i) State the rights of applicants and employees as well as the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified employees and applicants who are special disabled veterans, veterans of the Vietnam era, and other eligible veterans; and

(ii) Be in a form prescribed by the Deputy Assistant Secretary for Federal Contract Compliance Programs, Department of Labor (Deputy Assistant Secretary of Labor), and provided by or through the Contracting Officer.

(3) The Contractor shall ensure that applicants or employees who are special disabled veterans are informed of the contents of the notice (e.g., the Contractor may have the notice read to a visually disabled veteran, or may lower the posted notice so that it can be read by a person in a wheelchair).

(4) The Contractor shall notify each labor union or representative of workers with which it has a collective bargaining agreement, or other contract understanding, that the Contractor is bound by the terms of the Act and is committed to take affirmative action to employ, and advance in employment, qualified special disabled veterans, veterans of the Vietnam era, and other eligible veterans.

(f) *Noncompliance*. If the Contractor does not comply with the requirements of this clause, the Government may take appropriate actions under the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

(g) *Subcontracts*. The Contractor shall insert the terms of this clause in all subcontracts or purchase orders of \$25,000 or more unless exempted by rules, regulations, or orders of the Secretary of Labor. The Contractor shall act as specified by the Deputy Assistant Secretary of Labor to enforce the terms, including action for noncompliance.

(End of clause)

## **50. \*FAR 52.222-36 AFFIRMATIVE ACTION FOR WORKERS WITH DISABILITIES (JUN 1998)**

(a) General.

(1) Regarding any position for which the employee or applicant for employment is qualified, the Contractor shall not discriminate against any employee or applicant because of physical or mental disability. The Contractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified individuals with disabilities without discrimination based upon their physical or mental disability in all employment practices such as--

(i) Recruitment, advertising, and job application procedures;

- (ii) Hiring, upgrading, promotion, award of tenure, demotion, transfer, layoff, termination, right of return from layoff, and rehiring;
  - (iii) Rates of pay or other forms of compensation and changes in compensation;
  - (iv) Job assignments, job classifications, organizational structures, position descriptions, lines of progression, and seniority lists;
  - (v) Leaves of absence, sick leave, or any other leave;
  - (vi) Fringe benefits available by virtue of employment, whether or not administered by the Contractor;
  - (vii) Selection and financial support for training, including apprenticeships, professional meetings, conferences, and other related activities, and selection for leaves of absence to pursue training;
  - (viii) Activities sponsored by the Contractor, including social or recreational programs; and
  - (ix) Any other term, condition, or privilege of employment.
- (2) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor (Secretary) issued under the Rehabilitation Act of 1973 (29 U.S.C. 793) (the Act), as amended.
- (b) Postings.
- (1) The Contractor agrees to post employment notices stating--
    - (i) The Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified individuals with disabilities; and
    - (ii) The rights of applicants and employees.
  - (2) These notices shall be posted in conspicuous places that are available to employees and applicants for employment. The Contractor shall ensure that applicants and employees with disabilities are informed of the contents of the notice (e.g., the Contractor may have the notice read to visually disabled individual, or may lower the posted notice so that it might be read by a person in a wheelchair). The notices shall be in a form prescribed by the Deputy Assistant Secretary for Federal Contract Compliance of the U.S. Department of Labor (Deputy Assistant Secretary) and shall be provided by or through the Contracting Officer.
  - (3) The Contractor shall notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of Section 503 of the Act and is committed to take affirmative action to employ, and advance in employment, qualified individuals with physical or mental disabilities.
  - (c) Noncompliance. If the Contractor does not comply with the requirements of this clause, appropriate actions may be taken under the rules, regulations, and relevant orders of the Secretary issued pursuant to the Act.
  - (c) Subcontracts. The Contractor shall include the terms of this clause in every subcontract or purchase order in excess of \$10,000 unless exempted by rules, regulations, or orders of the Secretary. The Contractor shall act as specified by the Deputy Assistant Secretary to enforce the terms, including action for noncompliance.

**51. \*FAR 52.222-37 EMPLOYMENT REPORTS ON SPECIAL DISABLED VETERANS, VETERANS OF THE VIETNAM ERA, AND OTHER ELIGIBLE VETERANS (DEC 2001)**

- (a) Unless the Contractor is a State or local government agency, the Contractor shall report at least annually, as required by the Secretary of Labor, on—
  - (1) The number of special disabled veterans, the number of veterans of the Vietnam era, and other eligible veterans in the workforce of the Contractor by job category and hiring location; and
  - (2) The total number of new employees hired during the period covered by the report, and of the total, the number of special disabled veterans, the number of veterans of the Vietnam era, and the number of other eligible veterans; and
  - (3) The maximum number and the minimum number of employees of the Contractor during the period covered by the report.
- (b) The Contractor shall report the above items by completing the Form VETS-100, entitled "Federal Contractor Veterans' Employment Report (VETS-100 Report)".
- (c) The Contractor shall submit VETS-100 Reports no later than September 30 of each year beginning

September 30, 1988.

(d) The employment activity report required by paragraph (a)(2) of this clause shall reflect total hires during the most recent 12-month period as of the ending date selected for the employment profile report required by paragraph (a)(1) of this clause. Contractors may select an ending date—

(1) As of the end of any pay period between July 1 and August 31 of the year the report is due; or

(2) As of December 31, if the Contractor has prior written approval from the Equal Employment Opportunity Commission to do so for purposes of submitting the Employer Information Report EEO-1 (Standard Form 100).

(e) The Contractor shall base the count of veterans reported according to paragraph (a) of this clause on voluntary disclosure. Each Contractor subject to the reporting requirements at 38 U.S.C. 4212 shall invite all special disabled veterans, veterans of the Vietnam era, and other eligible veterans who wish to benefit under the affirmative action program at 38 U.S.C. 4212 to identify themselves to the Contractor. The invitation shall state that—

(1) The information is voluntarily provided;

(2) The information will be kept confidential;

(3) Disclosure or refusal to provide the information will not subject the applicant or employee to any adverse treatment; and

(4) The information will be used only in accordance with the regulations promulgated under 38 U.S.C. 4212.

(f) The Contractor shall insert the terms of this clause in all subcontracts or purchase orders of \$25,000 or more unless exempted by rules, regulations, or orders of the Secretary of Labor.

(End of clause)

## **52. \*FAR 52.222-38 COMPLIANCE WITH VETERANS' EMPLOYMENT REPORTING REQUIREMENTS (DEC 2001)**

By submission of its offer, the offeror represents that, if it is subject to the reporting requirements of 38 U.S.C. 4212(d) (*i.e.*, if it has any contract containing Federal Acquisition Regulation clause 52.222-37, Employment Reports on Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans), it has submitted the most recent VETS-100 Report required by that clause.

(End of provision)

## **53. \*FAR 52.223-3 HAZARDOUS MATERIAL IDENTIFICATION AND MATERIAL SAFETY DATA (JAN 1997)**

(a) "Hazardous material," as used in this clause, includes any material defined as hazardous under the latest version of Federal Standard No. 313 (including revisions adopted during the term of the contract).

(b) The offeror must list any hazardous material, as defined in paragraph (a) of this clause, to be delivered under this contract. The hazardous material shall be properly identified and include any applicable identification number, such as National Stock Number or Special Item Number. This information shall also be included on the Material Safety Data Sheet submitted under this contract.

Material (If none, insert "None")	Identification No.
_____	_____
_____	_____
_____	_____

(c) This list must be updated during performance of the contract whenever the Contractor determines that any other material to be delivered under this contract is hazardous.

(d) The apparently successful offeror agrees to submit, for each item as required prior to award, a Material Safety Data Sheet, meeting the requirements of 29 CFR 1910.1200(g) and the latest version of Federal Standard No. 313, for all hazardous material identified in paragraph (b) of this clause. Data shall be submitted in accordance with

Federal Standard No. 313, whether or not the apparently successful offeror is the actual manufacturer of these items. Failure to submit the Material Safety Data Sheet prior to award may result in the apparently successful offeror being considered nonresponsible and ineligible for award.

(e) If, after award, there is a change in the composition of the item(s) or a revision to Federal Standard No. 313, which renders incomplete or inaccurate the data submitted under paragraph (d) of this clause, the Contractor shall promptly notify the Contracting Officer and resubmit the data.

(f) Neither the requirements of this clause nor any act or failure to act by the Government shall relieve the Contractor of any responsibility or liability for the safety of Government, Contractor, or subcontractor personnel or property.

(g) Nothing contained in this clause shall relieve the Contractor from complying with applicable Federal, State, and local laws, codes, ordinances, and regulations (including the obtaining of licenses and permits) in connection with hazardous material.

(h) The Government's rights in data furnished under this contract with respect to hazardous material are as follows:

(1) To use, duplicate and disclose any data to which this clause is applicable. The purposes of this right are to--

(i) Apprise personnel of the hazards to which they may be exposed in using, handling, packaging, transporting, or disposing of hazardous materials;

(ii) Obtain medical treatment for those affected by the material; and

(iii) Have others use, duplicate, and disclose the data for the Government for these purposes.

(2) To use, duplicate, and disclose data furnished under this clause, in accordance with subparagraph (h)(1) of this clause, in precedence over any other clause of this contract providing for rights in data.

(3) The Government is not precluded from using similar or identical data acquired from other sources. (End of clause)

**54. \*FAR 52.223-5 POLLUTION PREVENTION AND RIGHT-TO-KNOW INFORMATION (APR 1998) [For Work on Federal Facilities]**

(a) Executive Order 12856 of August 3, 1993, requires Federal facilities to comply with the provisions of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11001-11050) and the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13101-13109).

(b) The Contractor shall provide all information needed by the Federal facility to comply with the emergency planning reporting requirements of Section 302 of EPCRA; the emergency notice requirements of Section 304 of EPCRA; the list of Material Safety Data Sheets required by Section 311 of EPCRA; the emergency and hazardous chemical inventory forms of Section 312 of EPCRA; the toxic chemical release inventory of Section 313 of EPCRA, which includes the reduction and recycling information required by Section 6607 of PPA; and the toxic chemical reduction goals requirements of Section 3-302 of Executive Order 12856.

**55. \*FAR 52.223-6 DRUG-FREE WORKPLACE (MAY 2001)**

(a) Definitions. As used in this clause--

"Controlled substance" means a controlled substance in schedules I through V of section 202 of the Controlled Substances Act (21 U.S.C. 812) and as further defined in regulation at 21 CFR 1308.11 - 1308.15.

"Conviction" means a finding of guilt (including a plea of nolo contendere) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes.

"Criminal drug statute" means a Federal or non-Federal criminal statute involving the manufacture, distribution, dispensing, possession or use of any controlled substance.

"Drug-free workplace" means the site(s) for the performance of work done by the Contractor in connection with a specific contract where employees of the Contractor are prohibited from engaging in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance.

"Employee" means an employee of a Contractor directly engaged in the performance of work under a Government contract. "Directly engaged" is defined to include all direct cost employees and any other Contractor employee who has other than a minimal impact or involvement in contract performance.

"Individual" means an offeror/contractor that has no more than one employee including the offeror/contractor.

(b) The Contractor, if other than an individual, shall--within 30 days after award (unless a longer period is agreed to in writing for contracts of 30 days or more performance duration), or as soon as possible for contracts of less than 30 days performance duration--

(1) Publish a statement notifying its employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition;

(2) Establish an ongoing drug-free awareness program to inform such employees about--

(i) The dangers of drug abuse in the workplace;

(ii) The Contractor's policy of maintaining a drug-free workplace;

(iii) Any available drug counseling, rehabilitation, and employee assistance

programs; and

(iv) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.

(3) Provide all employees engaged in performance of the contract with a copy of the statement required by subparagraph (b)(1) of this clause;

(4) Notify such employees in writing in the statement required by subparagraph (b)(1) of this clause that, as a condition of continued employment on this contract, the employee will--

(i) Abide by the terms of the statement; and

(ii) Notify the employer in writing of the employee's conviction under a criminal drug statute for a violation occurring in the workplace no later than 5 days after such conviction.

(5) Notify the Contracting Officer in writing within 10 days after receiving notice under subdivision (b)(4)(ii) of this clause, from an employee or otherwise receiving actual notice of such conviction. The notice shall include the position title of the employee;

(6) Within 30 days after receiving notice under subdivision (b)(4)(ii) of this clause of a conviction, take one of the following actions with respect to any employee who is convicted of a drug abuse violation occurring in the workplace:

(i) Taking appropriate personnel action against such employee, up to and including termination; or

(ii) Require such employee to satisfactorily participate in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency; and

(7) Make a good faith effort to maintain a drug-free workplace through implementation of subparagraphs (b)(1) through (b)(6) of this clause.

(c) The Contractor, if an individual, agrees by award of the contract or acceptance of a purchase order, not to engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance while performing this contract.

(d) In addition to other remedies available to the Government, the Contractor's failure to comply with the requirements of paragraph (b) or (c) of this clause may, pursuant to FAR 23.560, render the Contractor subject to suspension of contract payments, termination of the contract for default, and suspension or debarment.

**56. FAR 52.223-9 ESTIMATE OF PERCENTAGE OF RECOVERED MATERIAL CONTENT FOR EPA-DESIGNATED PRODUCTS (AUG 2000) [For Contracts exceeding \$100,000. EPA Designated product (available at <http://www.epa.gov/cpg/>)]**

(a) Definitions. As used in this clause--



“Postconsumer material” means a material or finished product that has served its intended use and has been discarded for disposal or recovery, having completed its life as a consumer item. Postconsumer material is a part of the broader category of “recovered material.”

“Recovered material” means waste materials and by-products recovered or diverted from solid waste, but the term does not include those materials and by-products generated from, and commonly reused within, an original manufacturing process.

- (b) The Contractor, on completion of this contract, shall—
- (1) Estimate the percentage of the total recovered material used in contract performance, including, if applicable, the percentage of postconsumer material content; and
  - (2) Submit this estimate to the Contracting Officer.
- (End of clause)

**57. \*FAR 52.223-14 TOXIC CHEMICAL RELEASE REPORTING (OCT 2000)**  
**[For Contracts Over \$100,000]**

(a) Unless otherwise exempt, the Contractor, as owner or operator of a facility used in the performance of this contract, shall file by July 1 for the prior calendar year an annual Toxic Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023(a) and (g)), and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106). The Contractor shall file, for each facility subject to the Form R filing and reporting requirements, the annual Form R throughout the life of the contract.

(b) A Contractor owned or operated facility use in the performance of this contract is exempt from the requirement to file an annual Form R if--

(1) The facility does not manufacture, process or otherwise use any toxic chemicals listed under section 313(c) of EPCRA, 42 U.S.C. 11023(c);

(2) The facility does not have 10 or more full-time employees as specified in section 313(b)(1)(A) of EPCRA, 42 U.S.C. 11023(b)(1)(A);

(3) The facility does not meet the reporting thresholds of toxic chemicals established under section 313(f) of EPCRA, 42 U.S.C. 11023(f) (including the alternate thresholds at 40 CFR 372.27, provided an appropriate certification form has been filed with EPA);

(4) The facility does not fall within Standard Industrial Classification Code (SIC) major groups 20 through 39 or their corresponding North American Industry Classification System (NAICS) sectors 31 through 33; or

(5) The facility is not located within any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, or any other territory or possession over which the United States has jurisdiction.

(c) If the Contractor has certified to an exemption in accordance with one or more of the criteria in paragraph (b) of this clause, and after award of the contract circumstances change so that any one of its owned or operated facilities used in the performance of this contract is no longer exempt-

(1) The Contractor shall notify the Contracting Officer;

and

(2) The Contractor, as owner or operator of a facility used in the performance of this contract is no longer exempt, shall (i) submit a Toxic Chemical Release Inventory Form (Form R) on or before July 1 for the prior calendar year during which the facility becomes eligible; and (ii) continue to file the annual Form R for the life of the contract for such facility.

(d) The Contracting Officer may terminate this contract or take other action as appropriate, if the Contractor fails to comply accurately and fully with the EPCRA and PPA toxic chemical release filing and reporting requirements.

(e) Except for acquisitions of commercial items, as defined in FAR Part 2, the Contractor shall-

(1) For competitive subcontracts expected to exceed \$100,000 (including all options), include a solicitation provision substantially the same as the provision at FAR 52.223-13, Certification of Toxic Chemical Release Reporting; and

(2) Include in any resultant subcontract exceeding \$100,000 (including all options), the substance of this clause, except this paragraph (e).

**58. DFARS 252.223-7006 PROHIBITION ON STORAGE AND DISPOSAL OF TOXIC AND HAZARDOUS MATERIALS (APR 1993)**

(a) Definitions. As used in this clause--

(1) "Storage" means a non-transitory, semi-permanent or permanent holding, placement, or leaving of material. It does not include a temporary accumulation of a limited quantity of a material used in or a waste generated or resulting from authorized activities, such as servicing, maintenance, or repair of Department of Defense (DoD) items, equipment, or facilities.

(2) "Toxic or hazardous materials" means:

(i) Materials referred to in section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (42 U.S.C. 9601(14)) and materials designated under section 102 of CERCLA (42 U.S.C. 9602) (40 CFR Part 302);

(ii) Materials that are of an explosive, flammable, or pyrotechnic nature; or

(iii) Materials otherwise identified by the Secretary of Defense as specified in DoD regulations.

(b) In accordance with 10 U.S.C. 2692, the Contractor is prohibited from storing or disposing of non-DoD-owned toxic or hazardous materials on a DoD installation, except to the extent authorized by a statutory exception to 10 U.S.C. 2692 or as authorized by the Secretary of Defense or his designee.

**59. \*FAR 52.225-9 BUY AMERICAN ACT—BALANCE OF PAYMENT PROGRAM—CONSTRUCTION MATERIALS (FEB 2002) (For Contracts less than \$6.806 million)**

(a) Definitions. As used in this clause—

“Component” means any article, material, or supply incorporated directly into a construction material.

“Construction material” means an article, material, or supply brought to the construction site by the Contractor or a subcontractor for incorporation into the building or work. The term also includes an item brought to the site preassembled from articles, materials, or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, that are discrete systems incorporated into a public building or work and that are produced as complete systems, are evaluated as a single and distinct construction material regardless of when or how the individual parts or components of those systems are delivered to the construction site. Materials purchased directly by the Government are supplies, not construction material.

“Cost of components” means—

(1) For components purchased by the Contractor, the acquisition cost, including transportation costs to the place of incorporation into the construction material (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or

(2) For components manufactured by the Contractor, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1) of this definition, plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the end product.

“Domestic construction material” means—

(1) An unmanufactured construction material mined or produced in the United States; or

(2) A construction material manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost

of all its components. Components of foreign origin of the same class or kind for which nonavailability determinations have been made are treated as domestic.

“Foreign construction material” means a construction material other than a domestic construction material.

“United States” means the 50 States and the District of Columbia, U.S. territories and possessions, Puerto Rico, the Northern Mariana Islands, and any other place subject to U.S. jurisdiction, but does not include leased bases.

(b) *Domestic preference.* (1) This clause implements the Buy American Act (41 U.S.C. 10a - 10d) and the Balance of Payments Program by providing a preference for domestic construction material. The Contractor shall use only domestic construction material in performing this contract, except as provided in paragraphs (b)(2) and (b)(3) of this clause.

(2) This requirement does not apply to the construction material or components listed by the Government as follows:

*[Contracting Officer to list applicable excepted materials or indicate “none”]*

(3) The Contracting Officer may add other foreign construction material to the list in paragraph (b)(2) of this clause if the Government determines that—

(i) The cost of domestic construction material would be unreasonable. The cost of a particular domestic construction material subject to the requirements of the Buy American Act is unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent. For determination of unreasonable cost under the Balance of Payments Program, the Contracting Officer will use a factor of 50 percent;

(ii) The application of the restriction of the Buy American Act or Balance of Payments Program to a particular construction material would be impracticable or inconsistent with the public interest; or

(iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.

(c) *Request for determination of inapplicability of the Buy American Act or Balance of Payments Program.*

(1)(i) Any Contractor request to use foreign construction material in accordance with paragraph (b)(3) of this clause shall include adequate information for Government evaluation of the request, including—

(A) A description of the foreign and domestic construction materials;

(B) Unit of measure;

(C) Quantity;

(D) Price;

(E) Time of delivery or availability;

(F) Location of the construction project;

(G) Name and address of the proposed supplier; and

(H) A detailed justification of the reason for use of foreign construction materials cited in accordance with paragraph (b)(3) of this clause.

(ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause.

(iii) The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

(iv) Any Contractor request for a determination submitted after contract award shall explain why the Contractor could not reasonably foresee the need for such determination and could not have requested the determination before contract award. If the Contractor does not submit a satisfactory explanation, the Contracting Officer need not make a determination.

(2) If the Government determines after contract award that an exception to the Buy American Act or Balance of Payments Program applies and the Contracting Officer and the Contractor negotiate adequate consideration, the Contracting Officer will modify the contract to allow use of the foreign construction material. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration is not less than the differential established in paragraph (b)(3)(i) of this clause.

(3) Unless the Government determines that an exception to the Buy American Act or Balance of Payments Program applies, use of foreign construction material is non-compliant with the Buy American Act or Balance of Payments Program.

(d) *Data.* To permit evaluation of requests under paragraph (c) of this clause based on unreasonable cost,



*[List name, address, telephone number, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary.]*

*[Include other applicable supporting information.]*

*[\* Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued).]*

(End of clause)

**61. \*FAR 52.225-11 BUY AMERICAN ACT—BALANCE OF PAYMENTS PROGRAM—  
CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (FEB 2002) [For Contracts more than  
\$6,806,000] ALTERNATE I (JUNE 2000) [For Contracts between \$6.806 and 7.068419 Million]**

(a) *Definitions.* As used in this clause—

“Component” means any article, material, or supply incorporated directly into a construction material.

“Construction material” means an article, material, or supply brought to the construction site by the Contractor or subcontractor for incorporation into the building or work. The term also includes an item brought to the site pre-assembled from articles, materials, or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, that are discrete systems incorporated into a public building or work and that are produced as complete systems, are evaluated as a single and distinct construction material regardless of when or how the individual parts or components of those systems are delivered to the construction site. Materials purchased directly by the Government are supplies, not construction material.

“Cost of components” means—

(1) For components purchased by the Contractor, the acquisition cost, including transportation costs to the place of incorporation into the construction material (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or

(2) For components manufactured by the Contractor, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1) of this definition, plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the end product.

“Designated country” means any of the following countries:

Aruba Kiribati  
Austria Korea, Republic of  
Bangladesh Lesotho  
Belgium Liechtenstein  
Benin Luxembourg  
Bhutan Malawi  
Botswana Maldives  
Burkina Faso Mali  
Burundi Mozambique  
Canada Nepal

Cape Verde Netherlands  
Central African Niger  
Republic  
Chad Norway  
Comoros Portugal  
Denmark Rwanda  
Djibouti Sao Tome and Principe  
Equatorial Guinea Sierra Leone  
Finland Singapore  
France Somalia  
Gambia Spain  
Germany Sweden  
Greece Switzerland  
Guinea Tanzania U.R.  
Guinea-Bissau Togo  
Haiti Tuvalu  
Hong Kong Uganda  
Iceland  
Ireland United Kingdom  
Israel Vanuatu  
Italy Western Samoa  
Japan Yemen

“Designated country construction material” means a construction material that—

- (1) Is wholly the growth, product, or manufacture of a designated country; or
- (2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a designated country into a new and different construction material distinct from the materials from which it was transformed.

“Domestic construction material” means—

- (1) An unmanufactured construction material mined or produced in the United States; or
- (2) A construction material manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind for which nonavailability determinations have been made are treated as domestic.

“Foreign construction material” means a construction material other than a domestic construction material.

“North American Free Trade Agreement country” means Canada or Mexico.

“North American Free Trade Agreement country construction material” means a construction material that—

- (1) Is wholly the growth, product, or manufacture of a North American Free Trade Agreement (NAFTA) country; or
- (2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a NAFTA country into a new and different construction material distinct from the materials from which it was transformed.

“United States” means the 50 States and the District of Columbia, U.S. territories and possessions, Puerto Rico, the Northern Mariana Islands, and any other place subject to U.S. jurisdiction, but does not include leased bases.

(b) *Construction materials.* (1) This clause implements the Buy American Act (41 U.S.C. 10a - 10d) and the Balance of Payments Program by providing a preference for domestic construction material. In addition, the Contracting Officer has determined that the Trade Agreements Act and the North American Free Trade Agreement (NAFTA) apply to this acquisition. Therefore, the Buy American Act and Balance of Payments Program restrictions are waived for designated country and NAFTA country construction materials.

- (2) The Contractor shall use only domestic, designated country, or NAFTA country construction

material in performing this contract, except as provided in paragraphs (b)(3) and (b)(4) of this clause.

(3) The requirement in paragraph (b)(2) of this clause does not apply to the construction materials or components listed by the Government as follows:

[Contracting Officer to list applicable excepted materials or indicate "none"]

(4) The Contracting Officer may add other foreign construction material to the list in paragraph (b)(3) of this clause if the Government determines that—

(i) The cost of domestic construction material would be unreasonable. The cost of a particular domestic construction material subject to the restrictions of the Buy American Act is unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent. For determination of unreasonable cost under the Balance of Payments Program, the Contracting Officer will use a factor of 50 percent;

(ii) The application of the restriction of the Buy American Act or Balance of Payments Program to a particular construction material would be impracticable or inconsistent with the public interest; or

(iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.

(c) *Request for determination of inapplicability of the Buy American Act or Balance of Payments Program.*  
(1)(i) Any Contractor request to use foreign construction material in accordance with paragraph (b)(4) of this clause shall include adequate information for Government evaluation of the request, including—

(A) A description of the foreign and domestic construction materials;

(B) Unit of measure;

(C) Quantity;

(D) Price;

(E) Time of delivery or availability;

(F) Location of the construction project;

(G) Name and address of the proposed supplier; and

(H) A detailed justification of the reason for use of foreign construction materials cited in accordance with paragraph (b)(3) of this clause.

(ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause.

(iii) The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

(iv) Any Contractor request for a determination submitted after contract award shall explain why the Contractor could not reasonably foresee the need for such determination and could not have requested the determination before contract award. If the Contractor does not submit a satisfactory explanation, the Contracting Officer need not make a determination.

(2) If the Government determines after contract award that an exception to the Buy American Act or Balance of Payments Program applies and the Contracting Officer and the Contractor negotiate adequate consideration, the Contracting Officer will modify the contract to allow use of the foreign construction material. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration is not less than the differential established in paragraph (b)(4)(i) of this clause.

(3) Unless the Government determines that an exception to the Buy American Act or Balance of Payments Program applies, use of foreign construction material is noncompliant with the Buy American Act or Balance of Payments Program.

(d) *Data.* To permit evaluation of requests under paragraph (c) of this clause based on unreasonable cost, the Contractor shall include the following information and any applicable supporting data based on the survey of suppliers:

FOREIGN AND DOMESTIC CONSTRUCTION MATERIALS PRICE COMPARISON			
Construction Material Description	Unit of Measure	Quantity	Price (Dollars)*
<i>Item 1:</i>			
Foreign construction material	_____	_____	_____
Domestic construction material	_____	_____	_____
<i>Item 2:</i>			
Foreign construction material	_____	_____	_____
Domestic construction material	_____	_____	_____

*[List name, address, telephone number, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary.]*

*[Include other applicable supporting information.]*

*[\* Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued).]*

(End of clause)

*Alternate I (June 2000).* As prescribed in 25.1102(c)(3), delete the definitions of “North American Free Trade Agreement country” and “North American Free Trade Agreement country construction material” from the definitions in paragraph (a) of the basic clause and substitute the following paragraphs (b)(1) and (b)(2) for paragraphs (b)(1) and (b)(2) of the basic clause:

(b) *Construction materials.* (1) This clause implements the Buy American Act (41 U.S.C. 10a-10d) and the Balance of Payments Program by providing a preference for domestic construction material. In addition, the Contracting Officer has determined that the Trade Agreements Act applies to this acquisition. Therefore, the Buy American Act and Balance of Payments Program restrictions are waived for designated country construction materials.

(2) The Contractor shall use only domestic or designated country construction material in performing this contract, except as provided in paragraphs (b)(3) and (b)(4) of this clause.

**62. \*FAR 52.225-12 NOTICE OF BUY AMERICAN ACT/BALANCE OF PAYMENTS PROGRAM REQUIREMENT—CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (FEB 2000)**  
**[Applicable with FAR 52.225-11] ALTERNATE II (June 2000) [For Contracts Between 6.806 and 7.068419 Million]**

(a) *Definitions.* “Construction material,” “designated country construction material,” “domestic construction material,” “foreign construction material,” and “NAFTA country construction material,” as used in this provision, are defined in the clause of this solicitation entitled “Buy American Act—Balance of Payments Program—Construction Materials under Trade Agreements” (Federal Acquisition Regulation (FAR) clause 52.225-11).

(b) *Requests for determination of inapplicability.* An offeror requesting a determination regarding the inapplicability of the Buy American Act or Balance of Payments Program should submit the request to the Contracting Officer in time to allow a determination before submission of offers. The offeror shall include the information and applicable supporting data required by paragraphs (c) and (d) of FAR clause 52.225-11 in the



request. If an offeror has not requested a determination regarding the inapplicability of the Buy American Act or Balance of Payments Program before submitting its offer, or has not received a response to a previous request, the offeror shall include the information and supporting data in the offer.

(c) *Evaluation of offers.* (1) The Government will evaluate an offer requesting exception to the requirements of the Buy American Act or Balance of Payments Program, based on claimed unreasonable cost of domestic construction materials, by adding to the offered price the appropriate percentage of the cost of such foreign construction material, as specified in paragraph (b)(4)(i) of FAR clause 52.225-11.

(2) If evaluation results in a tie between an offeror that requested the substitution of foreign construction material based on unreasonable cost and an offeror that did not request an exception, the Contracting Officer will award to the offeror that did not request an exception based on unreasonable cost.

(d) *Alternate offers.* (1) When an offer includes foreign construction material, other than designated country or NAFTA country construction material, that is not listed by the Government in this solicitation in paragraph (b)(3) of FAR clause 52.225-11, the offeror also may submit an alternate offer based on use of equivalent domestic, designated country, or NAFTA country construction material.

(2) If an alternate offer is submitted, the offeror shall submit a separate Standard Form 1442 for the alternate offer, and a separate price comparison table prepared in accordance with paragraphs (c) and (d) of FAR clause 52.225-11 for the offer that is based on the use of any foreign construction material for which the Government has not yet determined an exception applies.

(3) If the Government determines that a particular exception requested in accordance with paragraph (c) of FAR clause 52.225-11 does not apply, the Government will evaluate only those offers based on use of the equivalent domestic, designated country, or NAFTA country construction material, and the offeror shall be required to furnish such domestic, designated country, or NAFTA country construction material. An offer based on use of the foreign construction material for which an exception was requested—

- (i) Will be rejected as nonresponsive if this acquisition is conducted by sealed bidding; or
- (ii) May be accepted if revised during negotiations.

(End of provision)

#### **ALTERNATE II (June 2000) [For Contracts between 6.806 and 7.068419 Million]**

As prescribed in 25.1102(d)(3), substitute the following paragraphs (a) and (d) for paragraphs (a) and (d) of the basic provision:

(a) *Definitions.* “Construction material,” “designated country construction material,” “domestic construction material,” and “foreign construction material,” as used in this provision, are defined in the clause of this solicitation entitled “Buy American Act—Balance of Payments Program—Construction Materials under Trade Agreements” (Federal Acquisition Regulation (FAR) clause 52.225-11).

(d) *Alternate offers.* (1) When an offer includes foreign construction material, other than designated country construction material, that is not listed by the Government in this solicitation in paragraph (b)(3) of FAR clause 52.225-11, the offeror also may submit an alternate offer based on use of equivalent domestic or designated country construction material.

(2) If an alternate offer is submitted, the offeror shall submit a separate Standard Form 1442 for the alternate offer, and a separate price comparison table prepared in accordance with paragraphs (c) and (d) of FAR clause 52.225-11 for the offer that is based on the use of any foreign construction material for which the Government has not yet determined an exception applies.

(3) If the Government determines that a particular exception requested in accordance with paragraph (c) of FAR clause 52.225-11 does not apply, the Government will evaluate only those offers based on use of the equivalent domestic or designated country construction material, and the offeror shall be required to furnish such domestic or designated country construction material. An offer based on use of the foreign construction material for which an exception was requested—

- (i) Will be rejected as nonresponsive if this acquisition is conducted by sealed bidding; or
- (ii) May be accepted if revised during negotiations.

#### **63. \*FAR 52.225-13 RESTRICTIONS ON CERTAIN FOREIGN PURCHASES (JULY 2000)**

(a) The Contractor shall not acquire, for use in the performance of this contract, any supplies or services originating from sources within, or that were located in or transported from or through, countries whose products are banned from importation into the United States under regulations of the Office of Foreign Assets Control, Department of the Treasury. Those countries are Cuba, Iran, Iraq, Libya, North Korea, Sudan, the territory of Afghanistan controlled by the Taliban, and Serbia (excluding the territory of Kosovo).

(b) The Contractor shall not acquire for use in the performance of this contract any supplies or services from entities controlled by the government of Iraq.

(c) The Contractor shall insert this clause, including this paragraph (c), in all subcontracts.  
(End of clause)

**64. DFARS 252.226-7001 UTILIZATION OF INDIAN ORGANIZATIONS AND INDIAN-OWNED ECONOMIC ENTERPRISES--DOD CONTRACTS (SEP 2001)**

(a) *Definitions.* As used in this clause--

"Indian" means any person who is a member of any Indian tribe, band, group, pueblo, or community that is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs (BIA) in accordance with 25 U.S.C. 1452(c) and any "Native" as defined in the Alaska Native Claims Settlement Act (43 U.S.C. 1601).

"Indian organization" means the governing body of any Indian tribe or entity established or recognized by the governing body of an Indian tribe for the purposes of 25 U.S.C. Chapter 17.

"Indian-owned economic enterprise" means any Indian-owned (as determined by the Secretary of the Interior) commercial, industrial, or business activity established or organized for the purpose of profit, provided that Indian ownership constitutes not less than 51 percent of the enterprise.

"Indian tribe" means any Indian tribe, band, group, pueblo, or community, including native villages and native groups (including corporations organized by Kenai, Juneau, Sitka, and Kodiak) as defined in the Alaska Native Claims Settlement Act, that is recognized by the Federal Government as eligible for services from BIA in accordance with 25 U.S.C. 1452(c).

"Interested party" means a contractor or an actual or prospective offeror whose direct economic interest would be affected by the award of a subcontract or by the failure to award a subcontract.

(b) The Contractor shall use its best efforts to give Indian organizations and Indian-owned economic enterprises the maximum practicable opportunity to participate in the subcontracts it awards, to the fullest extent consistent with efficient performance of the contract.

(c) The Contracting Officer and the Contractor, acting in good faith, may rely on the representation of an Indian organization or Indian-owned economic enterprise as to its eligibility, unless an interested party challenges its status or the Contracting Officer has independent reason to question that status.

(d) In the event of a challenge to the representation of a subcontractor, the Contracting Officer will refer the matter to the--

U.S. Department of the Interior  
Bureau of Indian Affairs  
Attn: Chief, Division of Contracting and  
Grants Administration  
1849 C Street NW, MS-2626-MIB  
Washington, DC 20240-4000.

The BIA will determine the eligibility and will notify the Contracting Officer. No incentive payment will be made--

- (1) Within 50 working days of subcontract award;
- (2) While a challenge is pending; or
- (3) If a subcontractor is determined to be an ineligible participant.

(e)(1) The Contractor, on its own behalf or on behalf of a subcontractor at any tier, may request an adjustment under the Indian Incentive Program to the following:

- (i) The estimated cost of a cost-type contract.
    - (ii) The target cost of a cost-plus-incentive-fee contract.
    - (iii) The target cost and ceiling price of a fixed-price incentive contract.
    - (iv) The price of a firm-fixed-price contract.
  - (2) The amount of the adjustment that may be made to the contract is 5 percent of the estimated cost, target cost, or firm-fixed price included in the subcontract initially awarded to the Indian organization or Indian-owned economic enterprise.
  - (3) The Contractor has the burden of proving the amount claimed and must assert its request for an adjustment prior to completion of contract performance.
  - (4) The Contracting Officer, subject to the terms and conditions of the contract and the availability of funds, will authorize an incentive payment of 5 percent of the amount paid to the subcontractor.
  - (5) If the Contractor requests and receives an adjustment on behalf of a subcontractor, the Contractor is obligated to pay the subcontractor the adjustment.
  - (f) The Contractor shall insert the substance of this clause, including this paragraph (f), in all subcontracts that--
    - (1) Are for other than commercial items; and
    - (2) Are expected to exceed the simplified acquisition threshold in Part 2 of the Federal Acquisition Regulation.
- (End of clause)

**65. \*FAR 52.227-1 AUTHORIZATION AND CONSENT (JUL 1995)**

- (a) The Government authorizes and consents to all use and manufacture, in performing this contract or any subcontract at any tier, of any invention described in and covered by a United States patent
  - (1) embodied in the structure or composition of any article the delivery of which is accepted by the Government under this contract or
  - (2) used in machinery, tools, or methods whose use necessarily results from compliance by the Contractor or a subcontractor with
    - (i) specifications or written provisions forming a part of this contract or
    - (ii) specific written instructions given by the Contracting Officer directing the manner of performance. The entire liability to the Government for infringement of a patent of the United States shall be determined solely by the provisions of the indemnity clause, if any, included in this contract or any subcontract hereunder (including any lower-tier subcontract), and the Government assumes liability for all other infringement to the extent of the authorization and consent hereinabove granted.
- (b) The Contractor agrees to include, and require inclusion of, this clause, suitably modified to identify the parties, in all subcontracts at any tier for supplies or services (including construction, architect-engineer services, and materials, supplies, models, samples, and design or testing services expected to exceed the simplified acquisition threshold) however, omission of this clause from any subcontract, including those at or below the simplified acquisition threshold, does not affect this authorization and consent.

**66. \*FAR 52.227-2 NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT (AUG 1996)**

- (a) The Contractor shall report to the Contracting Officer, promptly and in reasonable written detail, each notice or claim of patent or copy-right infringement based on the performance of this contract of which the Contractor has knowledge.
- (b) In the event of any claim or suit against the Government on account of any alleged patent or copyright infringement arising out of the performance of this contract or out of the use of any supplies furnished or work or services performed under this contract, the Contractor shall furnish to the Government, when requested by the Contracting Officer, all evidence and information in possession of the Contractor pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Government except where the Contractor has agreed to indemnify the Government.

(c) The Contractor agrees to include, and require inclusion of, this clause in all subcontracts at any tier for supplies or services (including construction and architect-engineer subcontracts and those for material, supplies, models, samples, or design or testing services) expected to exceed the simplified acquisition threshold at FAR 2.101.

**67. \*FAR 52.227-4 PATENT INDEMNITY--CONSTRUCTION CONTRACTS (APR 1984)**

Except as otherwise provided, the Contractor agrees to indemnify the Government and its officers, agents, and employees against liability, including costs and expenses, for infringement upon any United States patent (except a patent issued upon an application that is now or may hereafter be withheld from issue pursuant to a Secrecy Order under 35 U.S.C. 181) arising out of performing this contract or out of the use or disposal by or for the account of the Government of supplies furnished or work performed under this contract.

**68. DFARS 252.227-7022 GOVERNMENT RIGHTS (UNLIMITED) (MAR 1979)**

The Government shall have unlimited rights, in all drawings, designs, specifications, notes and other works developed in the performance of this contract, including the right to use same on any other Government design or construction without additional compensation to the Contractor. The Contractor hereby grants to the Government a paid-up license throughout the world to all such works to which he may assert or establish any claim under design patent or copyright laws. The Contractor for a period of three (3) years after completion of the project agrees to furnish the original or copies of all such works on the request of the Contracting Officer. (End of clause)

**69. DFARS 252.227-7023 DRAWINGS AND OTHER DATA TO BECOME PROPERTY OF GOVERNMENT (MAR 1979)**

All designs, drawings, specifications, notes and other works developed in the performance of this contract shall become the sole property of the Government and may be used on any other design or construction without additional compensation to the Contractor. The Government shall be considered the "person for whom the work was prepared" for the purpose of authorship in any copyrightable

**70. DFARS 252.227-7033 RIGHTS IN SHOP DRAWINGS (APR 1966)**

(a) Shop drawings for construction means drawings, submitted to the Government by the Construction Contractor, subcontractor or any lower-tier subcontractor pursuant to a construction contract, showing in detail

(i) the proposed fabrication and assembly of structural elements and (ii) the installation (i.e., form, fit, and attachment details) of materials or equipment. The Government may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

(b) This clause, including this paragraph (b), shall be included in all subcontracts hereunder at any tier.

**71. \*FAR 52.228-2 ADDITIONAL BOND SECURITY (OCT 1997)**

The Contractor shall promptly furnish additional security required to protect the Government and persons supplying labor or materials under this contract if--

(a) Any surety upon any bond, or issuing financial institution for other security, furnished with this contract becomes unacceptable to the Government;

(b) Any surety fails to furnish reports on its financial condition as required by the Government;

(c) The contract price is increased so that the penal sum of any bond becomes inadequate in the opinion of the Contracting Officer; or

(d) An irrevocable letter of credit (ILC) used as security will expire before the end of the period of required security. If the Contractor does not furnish an acceptable extension or replacement ILC, or other acceptable substitute, at least 30 days before an ILC's scheduled expiration, the Contracting Officer has the right to immediately draw on the ILC.

**72. \*FAR 52.228-5 INSURANCE--WORK ON A GOVERNMENT INSTALLATION (JAN 1997) [For Contracts Exceeding \$100,000]**

(a) The Contractor shall, at its own expense, provide and maintain during the entire performance of this contract, at least the kinds and minimum amounts of insurance required in the Schedule or elsewhere in the contract.

(b) Before commencing work under this contract, the Contractor shall notify the Contracting Officer in writing that the required insurance has been obtained. The policies evidencing required insurance shall contain an endorsement to the effect that any cancellation or any material change adversely affecting the Government's interest shall not be effective

(1) for such period as the laws of the State in which this contract is to be performed prescribe, or

(2) until 30 days after the insurer or the Contractor gives written notice to the Contracting Officer, whichever period is longer.

(c) The Contractor shall insert the substance of this clause, including this paragraph (c), in subcontracts under this contract that require work on a Government installation and shall require subcontractors to provide and maintain the insurance required in the Schedule or elsewhere in the contract. The Contractor shall maintain a copy of all subcontractors' proofs of required insurance, and shall make copies available to the Contracting Officer upon request.

**73. \*FAR 52.228-11 PLEDGES OF ASSETS (FEB 1992)**

(a) Offerors shall obtain from each person acting as an individual surety on a bid guarantee, a performance bond, or a payment bond--

(1) Pledge of assets; and

(2) Standard Form 28, Affidavit of Individual Surety.

(b) Pledges of assets from each person acting as an individual surety shall be in the form of--

(1) Evidence of an escrow account containing cash, certificates of deposit, commercial or Government securities, or other assets described in FAR 28.203-2 (except see 28.203-2(b)(2) with respect to Government securities held in book entry form) and/or;

(2) A recorded lien on real estate. The offeror will be required to provide--

(i) Evidence of title in the form of a certificate of title prepared by a title insurance company approved by the United States Department of Justice. This title evidence must show fee simple title vested in the surety along with any concurrent owners; whether any real estate taxes are due and payable; and any recorded encumbrances against the property, including the lien filed in favor of the Government as required by FAR 28.203-3(d);

(ii) Evidence of the amount due under any encumbrance shown in the evidence of title;

(iii) A copy of the current real estate tax assessment of the property or a current appraisal dated no earlier than 6 months prior to the date of the bond, prepared by a professional appraiser who certifies that the appraisal has been conducted in accordance with the generally accepted appraisal standards as reflected in the Uniform Standards of Professional Appraisal Practice, as promulgated by the Appraisal Foundation.

**74. \*FAR 52.228-12 PROSPECTIVE SUBCONTRACTOR REQUESTS FOR BONDS (OCT 1995)**

In accordance with Section 806(a)(3) of Public Law 102-190, as amended by Sections 2091 and 8105 of Pub. L. 103-355, upon the request of a prospective subcontractor or supplier offering to furnish labor or material for the performance of this contract for which a payment bond has been furnished to the Government pursuant to the Miller Act, the Contractor shall promptly provide a copy of such payment bond to the requestor.

**75. FAR 52.228-14 IRREVOCABLE LETTER OF CREDIT (DEC 1999)**

(a) "Irrevocable letter of credit" (ILC), as used in this clause, means a written commitment by a federally insured financial institution to pay all or part of a stated amount of money, until the expiration date of the letter, upon presentation by the Government (the beneficiary) of a written demand therefor. Neither the financial institution nor the offeror/Contractor can revoke or condition the letter of credit.

(b) If the offeror intends to use an ILC in lieu of a bid bond, or to secure other types of bonds such as performance and payment bonds, the letter of credit and letter of confirmation formats in paragraphs (e) and (f) of this clause shall be used.

(c) The letter of credit shall be irrevocable, shall require presentation of no document other than a written demand and the ILC (including confirming letter, if any), shall be issued/confirmed by an acceptable federally insured financial institution as provided in paragraph (d) of this clause, and--

(1) If used as a bid guarantee, the ILC shall expire no earlier than 60 days after the close of the bid acceptance period;

(2) If used as an alternative to corporate or individual sureties as security for a performance or payment bond, the offeror/Contractor may submit an ILC to cover the entire period of performance or may submit an ILC with an initial expiration date estimated to cover the entire period for which financial security is required or may submit an ILC with an initial expiration that is a minimum period of one year from the date of issuance. The ILC shall provide that, unless the issuer provides the beneficiary written notice of non-renewal of least 60 days in advance of the current expiration date, the ILC is automatically extended without amendment for one year from the expiration date, or any future expiration date, until the period of required coverage is completed and the Contracting Officer provides the financial institution with a written statement waiving the right to payment. The period of required coverage shall be:

(i) For contracts subject to the Miller Act, the later of--

(A) One year following the expected date of final payment;

(B) For performance bonds only, until completion of any warranty period; or

(C) For payment bonds only, until resolution of all claims filed against the

payment bond during the one-year period following final payment.

(ii) For contracts not subject to the Miller Act, the later of--

(A) 90 days following final payment; or

(B) For performance bonds only, until completion of any warranty period.

(d) Only federally insured financial institution rated investment grade or higher shall issue or confirm the ILC. The offeror/Contractor shall provide the Contracting Officer a credit rating that indicates the financial institution has the required rating(s) as of the date of issuance of the ILC. Unless the financial institution issuing the ILC had letter of credit business of at least \$25 million in the past year, ILCs over \$5 million must be confirmed by another acceptable financial institution that had letter of credit business of at least \$25 million in the past year.

(e) The following format shall be used by the issuing financial institution to create an ILC:

-----  
[Issuing Financial Institution's Letterhead or Name and Address]

Issue Date -----

Irrevocable Letter of Credit No.-----

Account party's name-----

Account party's address-----

For Solicitation No.-----

(For reference only)

TO: [U.S. Government agency]  
[U.S. Government agency's address]

1. We hereby establish this irrevocable and transferable Letter of Credit in your favor for one or more drawings up to United States \$ \_\_\_\_\_. This Letter of Credit is payable at [issuing financial institution's and, if any, confirming financial institution's] office at [issuing financial institution's address and, if any, confirming financial institution's address] and expires with our close of business on \_\_\_\_\_, or any automatically extended expiration date.

2. We hereby undertake to honor your or transferee's sight draft(s) drawn on issuing or, if any, the confirming financial institution, for all or any part of this credit if presented with this Letter of Credit and confirmation, if any, at the office specified in paragraph 1 of this Letter of Credit on or before the expiration date or any automatically extended expiration date.

3. [This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.] It is a condition of this Letter of Credit that it is deemed to be automatically extended without amendment for one year from the expiration date hereof, or any future expiration date, unless at least 60 days prior to any expiration date, we notify you or the transferee by registered mail, or other receipted means of delivery, that we elect not to consider this Letter of Credit renewed for any such additional period. At the time we notify you, we also agree to notify the account party (and confirming financial institution, if any) by the same means of delivery.

4. This Letter of Credit is transferable. Transfers and assignments of proceeds are to be effected without charge to either the beneficiary or the transferee/assignee of proceeds. Such transfer or assignment shall be only at the written direction of the Government (the beneficiary) in a form satisfactory to the issuing financial institution and the confirming financial institution, if any.

5. This Letter of Credit is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of \_\_\_\_\_ [state of confirming financial institution, if any, otherwise state of issuing financial institution].

6. If this credit expires during an interruption of business of this financial institution as described in Article 17 of the UCP, the financial institution specifically agrees to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,

[Issuing financial institution]

(f) The following format shall be used by the financial institution to confirm an ILC:

[Confirming Financial Institution's Letterhead or Name and Address]---

(Date) \_\_\_\_\_

Our Letter of Credit

Advice Number-----

Beneficiary:-----

[U.S. Government agency]

Issuing Financial Institution:-----

Issuing Financial Institution's LC No.:-----

Gentlemen:

1. We hereby confirm the above indicated Letter of Credit, the original of which is attached, issued by \_\_\_\_\_ [name of issuing financial institution] for drawings of up to United States dollars \_\_\_\_\_/U.S. \$ \_\_\_\_\_ and expiring with our close of business on \_\_\_\_\_ [the expiration date], or any automatically extended expiration date.

2. Draft(s) drawn under the Letter of Credit and this Confirmation are payable at our office located at \_\_\_\_\_.

3. We hereby undertake to honor sight draft(s) drawn under and presented with the Letter of Credit and this Confirmation at our offices as specified herein.

4. [This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.] It is a condition of this confirmation that it be deemed automatically extended without amendment for one year from the expiration date hereof, or any automatically extended expiration date, unless:

(a) At least 60 days prior to any such expiration date, we shall notify the Contracting Officer, or the transferee and the issuing financial institution, by registered mail or other receipted means of delivery, that we elect not to consider this confirmation extended for any such additional period; or

(b) The issuing financial institution shall have exercised its right to notify you or the transferee, the account party, and ourselves, of its election not to extend the expiration date of the Letter of Credit.

5. This confirmation is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of \_\_\_\_\_ [state of confirming financial institution].

6. If this confirmation expires during an interruption of business of this financial institution as described in Article 17 of the UCP, we specifically agree to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,

-----  
[Confirming financial institution]

(g) The following format shall be used by the Contracting Officer for a sight draft to draw on the Letter of Credit:  
SIGHT DRAFT

-----  
[City, State]

(Date) \_\_\_\_\_

[Name and address of financial institution]

Pay to the order of-----

[Beneficiary Agency] \_\_\_\_\_

the sum of United States \$ \_\_\_\_\_

This draft is drawn under-----

Irrevocable Letter of Credit No.-----

-----  
[Beneficiary Agency]

By: \_\_\_\_\_

#### 76. \*FAR 52.228-15 PERFORMANCE AND PAYMENT BONDS (JULY 2000)

(a) *Definitions.* As used in this clause—

“Original contract price” means the award price of the contract; or, for requirements contracts, the price payable for the estimated total quantity; or, for indefinite-quantity contracts, the price payable for the specified minimum quantity. Original contract price does not include the price of any options, except those options exercised at the time of contract award.

(b) *Amount of required bonds.* Unless the resulting contract price is \$100,000 or less, the successful offeror shall furnish performance and payment bonds to the Contracting Officer as follows:

(1) *Performance bonds (Standard Form 25).* The penal amount of performance bonds at the time of contract award shall be 100 percent of the original contract price.

(2) *Payment Bonds (Standard Form 25-A).* The penal amount of payment bonds at the time of contract award shall be 100 percent of the original contract price.

(3) *Additional bond protection.* (i) The Government may require additional performance and



payment bond protection if the contract price is increased. The increase in protection generally will equal 100 percent of the increase in contract price.

(ii) The Government may secure the additional protection by directing the Contractor to increase the penal amount of the existing bond or to obtain an additional bond.

(c) *Furnishing executed bonds.* The Contractor shall furnish all executed bonds, including any necessary reinsurance agreements, to the Contracting Officer, within the time period specified in the Bid Guarantee provision of the solicitation, or otherwise specified by the Contracting Officer, but in any event, before starting work.

(d) *Surety or other security for bonds.* The bonds shall be in the form of firm commitment, supported by corporate sureties whose names appear on the list contained in Treasury Department Circular 570, individual sureties, or by other acceptable security such as postal money order, certified check, cashier's check, irrevocable letter of credit, or, in accordance with Treasury Department regulations, certain bonds or notes of the United States. Treasury Circular 570 is published in the Federal Register or may be obtained from the:

U.S. Department of Treasury  
Financial Management Service  
Surety Bond Branch  
401 14th Street, NW, 2nd Floor, West Wing  
Washington, DC 20227.

(e) *Notice of subcontractor waiver of protection (40 U.S.C. 270b(c)).* Any waiver of the right to sue on the payment bond is void unless it is in writing, signed by the person whose right is waived, and executed after such person has first furnished labor or material for use in the performance of the contract.  
(End of clause)

**77. FAR 52.229-3 FEDERAL, STATE, AND LOCAL TAXES (JAN 1991) [For Contracts Exceeding \$100,000]**

(a) "Contract date," as used in this clause, means the date set for bid opening or, if this is a negotiated contract or a modification, the effective date of this contract or modification.

"All applicable Federal, State, and local taxes and duties," as used in this clause, means all taxes and duties, in effect on the contract date, that the taxing authority is imposing and collecting on the transactions or property covered by this contract.

"After-imposed Federal tax," as used in this clause, means any new or increased Federal excise tax or duty, or tax that was exempted or excluded on the contract date but whose exemption was later revoked or reduced during the contract period, on the transactions or property covered by this contract that the Contractor is required to pay or bear as the result of legislative, judicial, or administrative action taking effect after the contract date. It does not include social security tax or other employment taxes.

"After-relieved Federal tax," as used in this clause, means any amount of Federal excise tax or duty, except social security or other employment taxes, that would otherwise have been payable on the transactions or property covered by this contract, but which the Contractor is not required to pay or bear, or for which the Contractor obtains a refund or drawback, as the result of legislative, judicial, or administrative action taking effect after the contract date.

(b) The contract price includes all applicable Federal, State, and local taxes and duties.

(c) The contract price shall be increased by the amount of any after-imposed Federal tax, provided the Contractor warrants in writing that no amount for such newly imposed Federal excise tax or duty or rate increase was included in the contract price, as a contingency reserve or otherwise.

(d) The contract price shall be decreased by the amount of any after-relieved Federal tax.

(e) The contract price shall be decreased by the amount of any Federal excise tax or duty, except social security or other employment taxes, that the Contractor is required to pay or bear, or does not obtain a refund of, through the Contractor's fault, negligence, or failure to follow instructions of the Contracting Officer.

(f) No adjustment shall be made in the contract price under this clause unless the amount of the adjustment exceeds \$250.

(g) The Contractor shall promptly notify the Contracting Officer of all matters relating to any Federal excise tax or duty that reasonably may be expected to result in either an increase or decrease in the contract price and shall take appropriate action as the Contracting Officer directs.

(h) The Government shall, without liability, furnish evidence appropriate to establish exemption from any Federal, State, or local tax when the Contractor requests such evidence and a reasonable basis exists to sustain the exemption.

**78. FAR 52.229-5 TAXES--CONTRACTS PERFORMED IN U.S. POSSESSIONS OR PUERTO RICO (APR 1984)**

The term "local taxes," as used in the Federal, State, and local taxes clause of this contract, includes taxes imposed by a possession of the United States or by Puerto Rico.

**79. FAR 52.230-1 COST ACCOUNTING STANDARDS NOTICES AND CERTIFICATION (JUNE 2000)**

Note: This notice does not apply to small businesses or foreign governments. This notice is in three parts, identified by Roman numerals I through III.

Offerors shall examine each part and provide the requested information in order to determine Cost Accounting Standards (CAS) requirements applicable to any resultant contract.

If the offeror is an educational institution, Part II does not apply unless the contemplated contract will be subject to full or modified CAS coverage pursuant to 48 CFR 9903.201-2(c)(5) or 9903.201-2(c)(6), respectively.

**I. DISCLOSURE STATEMENT--COST ACCOUNTING PRACTICES AND CERTIFICATION**

(a) Any contract in excess of \$500,000 resulting from this solicitation will be subject to the requirements of the Cost Accounting Standards Board (48 CFR Chapter 99), except for those contracts which are exempt as specified in 48 CFR 9903.201-1.

(b) Any offeror submitting a proposal which, if accepted, will result in a contract subject to the requirements of 48 CFR Chapter 99 must, as a condition of contracting, submit a Disclosure Statement as required by 48 CFR 9903.202. When required, the Disclosure Statement must be submitted as a part of the offeror's proposal under this solicitation unless the offeror has already submitted a Disclosure Statement disclosing the practices used in connection with the pricing of this proposal. If an applicable Disclosure Statement has already been submitted, the offeror may satisfy the requirement for submission by providing the information requested in paragraph (c) of Part I of this provision.

CAUTION: In the absence of specific regulations or agreement, a practice disclosed in a Disclosure Statement shall not, by virtue of such disclosure, be deemed to be a proper, approved, or agreed-to practice for pricing proposals or accumulating and reporting contract performance cost data.

(c) Check the appropriate box below:

☐ (1) Certificate of Concurrent Submission of Disclosure Statement

The offeror hereby certifies that, as a part of the offer, copies of the Disclosure Statement have been submitted as follows: (i) original and one copy to the cognizant Administrative Contracting Officer (ACO) or cognizant Federal agency official authorized to act in that capacity (Federal official), as applicable, and (ii) one copy to the cognizant Federal auditor.

(Disclosure must be on Form No. CASB DS-1 or CASB DS-2, as applicable. Forms may be obtained from the cognizant ACO or Federal official and/or from the loose-leaf version of the Federal Acquisition Regulation.)

Date of Disclosure Statement: \_\_\_\_\_

Name and Address of Cognizant ACO or Federal Official Where Filed:

---

The offeror further certifies that the practices used in estimating costs in pricing this proposal are consistent with the cost accounting practices disclosed in the Disclosure Statement.

☐ (2) Certificate of Previously Submitted Disclosure Statement.

The offeror hereby certifies that the required Disclosure Statement was filed as follows:

Date of Disclosure Statement: \_\_\_\_\_

Name and Address of Cognizant ACO or Federal Official Where Filed:

---

The offeror further certifies that the practices used in estimating costs in pricing this proposal are consistent with the cost accounting practices disclosed in the applicable Disclosure Statement.

☐ (3) Certificate of Monetary Exemption.

The offeror hereby certifies that the offeror, together with all divisions, subsidiaries, and affiliates under common control, did not receive net awards of negotiated prime contracts and subcontracts subject to CAS totaling \$50 million or more in the cost accounting period immediately preceding the period in which this proposal was submitted. The offeror further certifies that if such status changes before an award resulting from this proposal, the offeror will advise the Contracting Officer immediately.

☐ (4) Certificate of Interim Exemption.

The offeror hereby certifies that (i) the offeror first exceeded the monetary exemption for disclosure, as defined in (3) of this subsection, in the cost accounting period immediately preceding the period in which this offer was submitted and (ii) in accordance with 48 CFR 9903.202-1, the offeror is not yet required to submit a Disclosure Statement. The offeror further certifies that if an award resulting from this proposal has not been made within 90 days after the end of that period, the offeror will immediately submit a revised certificate to the Contracting Officer, in the form specified under subparagraph (c)(1) or (c)(2) of Part I of this provision, as appropriate, to verify submission of a completed Disclosure Statement.

CAUTION: Offerors currently required to disclose because they were awarded a CAS-covered prime contract or subcontract of \$50 million or more in the current cost accounting period may not claim this exemption (4). Further, the exemption applies only in connection with proposals submitted before expiration of the 90-day period following the cost accounting period in which the monetary exemption was exceeded.

## II. COST ACCOUNTING STANDARDS--ELIGIBILITY FOR MODIFIED CONTRACT COVERAGE

If the offeror is eligible to use the modified provisions of 48 CFR 9903.201-2(b) and elects to do so, the offeror shall indicate by checking the box below. Checking the box below shall mean that the resultant contract is subject to the Disclosure and Consistency of Cost Accounting Practices clause in lieu of the Cost Accounting Standards clause.

☐ The offeror hereby claims an exemption from the Cost Accounting Standards clause under the provisions of 48 CFR 9903.201-2(b) and certifies that the offeror is eligible for use of the Disclosure and Consistency of Cost Accounting Practices clause because during the cost accounting period immediately preceding the period in which this proposal was submitted, the offeror received less than \$50 million in awards of CAS-covered prime contracts and subcontracts. The offeror further certifies that if such status changes before an award resulting from this proposal, the offeror will advise the Contracting Officer immediately.

CAUTION: An offeror may not claim the above eligibility for modified contract coverage if this proposal is expected to result in the award of a CAS-covered contract of \$50 million or more or if, during its current cost

accounting period, the offeror has been awarded a single CAS-covered prime contract or subcontract of \$50 million or more.

### III. ADDITIONAL COST ACCOUNTING STANDARDS APPLICABLE TO EXISTING CONTRACTS

The offeror shall indicate below whether award of the contemplated contract would, in accordance with subparagraph (a)(3) of the Cost Accounting Standards clause, require a change in established cost accounting practices affecting existing contracts and subcontracts.

☐ YES    ☐ NO  
(End of provision)

#### **80.        \*FAR 52.230-2                    COST ACCOUNTING STANDARDS (APR 1998)**

(a) Unless the contract is exempt under 48 CFR 9903.201-1 and 9903.201-2, the provisions of 48 CFR Part 9903 are incorporated herein by reference and the Contractor, in connection with this contract, shall--

(1) (CAS-covered Contracts Only) By submission of a Disclosure Statement, disclose in writing the Contractor's cost accounting practices as required by 48 CFR 9903.202-1 through 9903.202-5, including methods of distinguishing direct costs from indirect costs and the basis used for allocating indirect costs. The practices disclosed for this contract shall be the same as the practices currently disclosed and applied on all other contracts and subcontracts being performed by the Contractor and which contain a Cost Accounting Standards (CAS) clause. If the Contractor has notified the Contracting Officer that the Disclosure Statement contains trade secrets and commercial or financial information which is privileged and confidential, the Disclosure Statement shall be protected and shall not be released outside of the Government.

(2) Follow consistently the Contractor's cost accounting practices in accumulating and reporting contract performance cost data concerning this contract. If any change in cost accounting practices is made for the purposes of any contract or subcontract subject to CAS requirements, the change must be applied prospectively to this contract and the Disclosure Statement must be amended accordingly. If the contract price or cost allowance of this contract is affected by such changes, adjustment shall be made in accordance with subparagraph (a)(4) or (a)(5) of this clause, as appropriate.

(3) Comply with all CAS, including any modifications and interpretations indicated thereto contained in 48 CFR Part 9904, in effect on the date of award of this contract or, if the Contractor has submitted cost or pricing data, on the date of final agreement on price as shown on the Contractor's signed certificate of current cost or pricing data. The Contractor shall also comply with any CAS (or modifications to CAS) which hereafter become applicable to a contract or subcontract of the Contractor. Such compliance shall be required prospectively from the date of applicability to such contract or subcontract.

(4)(i) Agree to an equitable adjustment as provided in the Changes clause of this contract if the contract cost is affected by a change which, pursuant to subparagraph (a)(3) of this clause, the Contractor is required to make to the Contractor's established cost accounting practices.

(ii) Negotiate with the Contracting Officer to determine the terms and conditions under which a change may be made to a cost accounting practice, other than a change made under other provisions of subparagraph (a)(4) of this clause; provided that no agreement may be made under this provision that will increase costs paid by the United States.

(iii) When the parties agree to a change to a cost accounting practice, other than a change under subdivision (a)(4)(i) of this clause, negotiate an equitable adjustment as provided in the Changes clause of this contract.

(5) Agree to an adjustment of the contract price or cost allowance, as appropriate, if the Contractor or a subcontractor fails to comply with an applicable Cost Accounting Standard, or to follow any cost accounting practice consistently and such failure results in any increased costs paid by the United States. Such adjustment shall

provide for recovery of the increased costs to the United States, together with interest thereon computed at the annual rate established under section 6621 of the Internal Revenue Code of 1986 (26 U.S.C. 6621) for such period, from the time the payment by the United States was made to the time the adjustment is effected. In no case shall the Government recover costs greater than the increased cost to the Government, in the aggregate, on the relevant contracts subject to the price adjustment, unless the Contractor made a change in its cost accounting practices of which it was aware or should have been aware at the time of price negotiations and which it failed to disclose to the Government.

(b) If the parties fail to agree whether the Contractor or a subcontractor has complied with an applicable CAS in 48 CFR 9904 or a CAS rule or regulation in 48 CFR 9903 and as to any cost adjustment demanded by the United States, such failure to agree will constitute a dispute under the Contract Disputes Act (41 U.S.C. 601).

(c) The Contractor shall permit any authorized representatives of the Government to examine and make copies of any documents, papers, or records relating to compliance with the requirements of this clause.

(d) The Contractor shall include in all negotiated subcontracts which the Contractor enters into, the substance of this clause, except paragraph (b), and shall require such inclusion in all other subcontracts, of any tier, including the obligation to comply with all CAS in effect on the subcontractor's award date or if the subcontractor has submitted cost or pricing data, on the date of final agreement on price as shown on the subcontractor's signed Certificate of Current Cost or Pricing Data. If the subcontract is awarded to a business unit which pursuant to 48 CFR 9903.201-2 is subject to other types of CAS coverage, the substance of the applicable clause set forth in subsection 30.201-4 of the Federal Acquisition Regulation shall be inserted. This requirement shall apply only to negotiated subcontracts in excess of \$500,000, except that the requirement shall not apply to negotiated subcontracts otherwise exempt from the requirement to include a CAS clause as specified in 48 CFR 9903.201-1.

(End of clause)

**81. \*FAR 52.230-3 DISCLOSURE AND CONSISTENCY OF COST ACCOUNTING PRACTICES (APR 1998)**

(a) The Contractor, in connection with this contract, shall--

(1) Comply with the requirements of 48 CFR 9904.401, Consistency in Estimating, Accumulating, and Reporting Costs; 48 CFR 9904.402, Consistency in Allocating Costs Incurred for the Same Purpose; 48 CFR 9904.405, Accounting for Unallowable Costs; and 48 CFR 9904.406, Cost Accounting Standard--Cost Accounting Period, in effect on the date of award of this contract as indicated in 48 CFR Part 9904.

(2) (CAS-covered Contracts Only) If it is a business unit of a company required to submit a Disclosure Statement, disclose in writing its cost accounting practices as required by 48 CFR 9903.202-1 through 9903.202-5. If the Contractor has notified the Contracting Officer that the Disclosure Statement contains trade secrets and commercial or financial information which is privileged and confidential, the Disclosure Statement shall be protected and shall not be released outside of the Government.

(3)(i) Follow consistently the Contractor's cost accounting practices. A change to such practices may be proposed, however, by either the Government or the Contractor, and the Contractor agrees to negotiate with the Contracting Officer the terms and conditions under which a change may be made. After the terms and conditions under which the change is to be made have been agreed to, the change must be applied prospectively to this contract, and the Disclosure Statement, if affected, must be amended accordingly.

(ii) The Contractor shall, when the parties agree to a change to a cost accounting practice and the Contracting Officer has made the finding required in 48 CFR 9903.201-6(b), that the change is desirable and not detrimental to the interests of the Government, negotiate an equitable adjustment as provided in the Changes clause of this contract. In the absence of the required finding, no agreement may be made under this contract clause that will increase costs paid by the United States.

(4) Agree to an adjustment of the contract price or cost allowance, as appropriate, if the Contractor or a subcontractor fails to comply with the applicable CAS or to follow any cost accounting practice, and such failure results in any increased costs paid by the United States. Such adjustment shall provide for recovery of the increased costs to the United States together with interest thereon computed at the annual rate of interest established

under the Internal Revenue Code of 1986 (26 U.S.C. 6621), from the time the payment by the United States was made to the time the adjustment is effected.

(b) If the parties fail to agree whether the Contractor has complied with an applicable CAS, rule, or regulation as specified in 48 CFR 9903 and 9904 and as to any cost adjustment demanded by the United States, such failure to agree will constitute a dispute under the Contract Disputes Act (41 U.S.C. 601).

(c) The Contractor shall permit any authorized representatives of the Government to examine and make copies of any documents, papers, and records relating to compliance with the requirements of this clause.

(d) The Contractor shall include in all negotiated subcontracts, which the Contractor enters into, the substance of this clause, except paragraph (b), and shall require such inclusion in all other subcontracts of any tier, except that--

(1) If the subcontract is awarded to a business unit which pursuant to 48 CFR 9903.201-2 is subject to other types of CAS coverage, the substance of the applicable clause set forth in subsection 30.201-4 of the Federal Acquisition Regulation shall be inserted.

(2) This requirement shall apply only to negotiated subcontracts in excess of \$500,000.

(3) The requirement shall not apply to negotiated subcontracts otherwise exempt from the requirement to include a CAS clause as specified in 48 CFR 9903.201-1.

(End of clause)

## **82. DFARS 252.231-7000 SUPPLEMENTAL COST PRINCIPLES (DEC 1991)**

When the allowability of costs under this contract is determined in accordance with part 31 of the Federal Acquisition Regulation (FAR) allowability shall also be determined in accordance with part 231 of the DoD FAR Supplement, in effect on the date of this contract.

## **83. \*FAR 52.232-5 PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS (MAY 1997)**

(a) Payment of Price. The Government shall pay the Contractor the contract price as provided in this contract.

(b) Progress Payments. The Government shall make progress payments monthly as the work proceeds, or at more frequent intervals as determined by the Contracting Officer, on estimates of work accomplished which meets the standards of quality established under the contract, as approved by the Contracting Officer.

(1) The Contractor's request for progress payments shall include the following substantiation:

(i) An itemization of the amounts requested, related to the various elements of work required by the contract covered by the payment requested.

(ii) A listing of the amount included for work performed by each subcontractor under the contract.

(iii) A listing of the total amount of each subcontract under the contract.

(iv) A listing of the amounts previously paid to each such subcontractor under the contract.

(v) Additional supporting data in a form and detail required by the Contracting Officer.

(2) In the preparation of estimates, the Contracting Officer may authorize material delivered on the site and preparatory work done to be taken into consideration. Material delivered to the Contractor at locations other than the site also may be taken into consideration if--

(i) Consideration is specifically authorized by this contract; and

(ii) The Contractor furnishes satisfactory evidence that it has acquired title to such material and that the material will be used to perform this contract.

(c) Contractor Certification. Along with each request for progress payments, the Contractor shall furnish the following certification, or payment shall not be made: (However, if the Contractor elects to delete paragraph

(c)(4) from the certification, the certification is still acceptable.) I hereby certify, to the best of my knowledge and belief, that--

(1) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;

(2) Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements and the requirements of chapter 39 of Title 31, United States Code;

(3) This request for progress payments does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract; and

(4) This certification is not to be construed as final acceptance of a subcontractor's performance.

-----  
(Name)

-----  
(Title)

-----  
(Date)

(d) Refund of Unearned Amounts. If the Contractor, after making a certified request for progress payments, discovers that a portion or all of such request constitutes a payment for performance by the Contractor that fails to conform to the specifications, terms, and conditions of this contract (hereinafter referred to as the "unearned amount"), the Contractor shall--

(1) Notify the Contracting Officer of such performance deficiency; and

(2) Be obligated to pay the Government an amount (computed by the Contracting Officer in the manner provided in paragraph (j) of this clause) equal to interest on the unearned amount from the 8th day after the date of receipt of the unearned amount until--

(i) The date the Contractor notifies the Contracting Officer that the performance deficiency has been corrected; or

(ii) The date the Contractor reduces the amount of any subsequent certified request for progress payments by an amount equal to the unearned amount.

(e) Retainage. If the Contracting Officer finds that satisfactory progress was achieved during any period for which a progress payment is to be made, the Contracting Officer shall authorize payment to be made in full. However, if satisfactory progress has not been made, the Contracting Officer may retain a maximum of 10 percent of the amount of the payment until satisfactory progress is achieved. When the work is substantially complete, the Contracting Officer may retain from previously withheld funds and future progress payments that amount the Contracting Officer considers adequate for protection of the Government and shall release to the Contractor all the remaining withheld funds. Also, on completion and acceptance of each separate building, public work, or other division of the contract, for which the price is stated separately in the contract, payment shall be made for the completed work without retention of a percentage.

(f) Title, Liability, and Reservation of Rights. All material and work covered by progress payments made shall, at the time of payment, become the sole property of the Government, but this shall not be construed as--

(1) Relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or

(2) Waiving the right of the Government to require the fulfillment of all of the terms of the contract.

(g) Reimbursement for Bond Premiums. In making these progress payments, the Government shall, upon request, reimburse the Contractor for the amount of premiums paid for performance and payment bonds (including coinsurance and reinsurance agreements, when applicable) after the Contractor has furnished evidence of full payment to the surety. The retainage provisions in paragraph (e) of this clause shall not apply to that portion of progress payments attributable to bond premiums.

(h) Final Payment. The Government shall pay the amount due the Contractor under this contract after--

(1) Completion and acceptance of all work;

(2) Presentation of a properly executed voucher; and  
(3) Presentation of release of all claims against the Government arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. A release may also be required of the assignee if the Contractor's claim to amounts payable under this contract has been assigned under the Assignment of Claims Act of 1940 (31 U.S.C. 3727 and 41 U.S.C. 15).

(i) Limitation Because of Unfinalized Work. Notwithstanding any provision of this contract, progress payments shall not exceed 80 percent on work accomplished on unfinalized contract actions. A "contract action" is any action resulting in a contract, as defined in FAR Subpart 2.1, including contract modifications for additional supplies or services, but not including contract modifications that are within the scope and under the terms of the contract, such as contract modifications issued pursuant to the Changes clause, or funding and other administrative changes.

(j) Interest Computation on Unearned Amounts. In accordance with 31 U.S.C. 3903(c)(1), the amount payable under subparagraph (d)(2) of this clause shall be--

(1) Computed at the rate of average bond equivalent rates of 91-day Treasury bills auctioned at the most recent auction of such bills prior to the date the Contractor receives the unearned amount; and

(2) Deducted from the next available payment to the Contractor.

**84. RESERVED.**

**85. \*FAR 52.232-10 PAYMENTS UNDER FIXED-PRICE ARCHITECT-ENGINEER CONTRACTS (AUG 1987)**

(a) Estimates shall be made monthly of the amount and value of the work and services performed by the Contractor under this contract which meet the standards of quality established under this contract. The estimates shall be prepared by the Contractor and accompanied by any supporting data required by the Contracting Officer.

(b) Upon approval of the estimate by the Contracting Officer, payment upon properly executed vouchers shall be made to the Contractor, as soon as practicable, of 90 percent of the approved amount, less all previous payments; provided, that payment may be made in full during any months in which the Contracting Officer determines that performance has been satisfactory. Also, whenever the Contracting Officer determines that the work is substantially complete and that the amount retained is in excess of the amount adequate for the protection of the Government, the Contracting Officer may release the excess amount to the Contractor.

(c) Upon satisfactory completion by the Contractor and acceptance by the Contracting Officer of the work done by the Contractor under the "Statement of Architect-Engineer Services", the Contractor will be paid the unpaid balance of any money due for work under the statement, including retained percentages relating to this portion of the work. Upon satisfactory completion and final acceptance of the construction work, the Contractor shall be paid any unpaid balance of money due under this contract.

(d) Before final payment under the contract, or before settlement upon termination of the contract, and as a condition precedent thereto, the Contractor shall execute and deliver to the Contracting Officer a release of all claims against the Government arising under or by virtue of this contract, other than any claims that are specifically excepted by the Contractor from the operation of the release in amounts stated in the release.

(e) Notwithstanding any other provision in this contract, and specifically paragraph (b) of this clause, progress payments shall not exceed 80 percent on work accomplished on unfinalized contract actions. A "contract action" is any action resulting in a contract, as defined in FAR Subpart 2.1, including contract modifications for additional supplies or services, but not including contract modifications that are within the scope and under the terms of the contract, such as contract modifications issued pursuant to the Changes clause, or funding and other administrative changes. (End of clause)

**86. \*FAR 52.232-17 INTEREST (JUN 1996)**



(a) Except as otherwise provided in this contract under a Price Reduction for Defective Cost or Pricing Data clause or a Cost Accounting Standards clause, all amounts that become payable by the Contractor to the Government under this contract (net of any applicable tax credit under the Internal Revenue Code (26 U.S.C. 1481)) shall bear simple interest from the date due until paid unless paid within 30 days of becoming due. The interest rate shall be the interest rate established by the Secretary of the Treasury as provided in Section 12 of the Contract Disputes Act of 1978 (Public Law 95-563), which is applicable to the period in which the amount becomes due, as provided in paragraph (b) of this clause, and then at the rate applicable for each six-month period as fixed by the Secretary until the amount is paid.

(b) Amounts shall be due at the earliest of the following dates:

(1) The date fixed under this contract.

(2) The date of the first written demand for payment consistent with this contract, including any demand resulting from a default termination.

(3) The date the Government transmits to the Contractor a proposed supplemental agreement to confirm completed negotiations establishing the amount of debt.

(4) If this contract provides for revision of prices, the date of written notice to the Contractor stating the amount of refund payable in connection with a pricing proposal or a negotiated pricing agreement not confirmed by contract modification.

(c) The interest charge made under this clause may be reduced under the procedures prescribed in 32.614-2 of the Federal Acquisition Regulation in effect on the date of this contract.

#### **87. \*FAR 52.232-23 ASSIGNMENT OF CLAIMS (JAN 1986)**

(a) The Contractor, under the Assignment of Claims Act, as amended, 31 U.S.C. 3727, 41 U.S.C. 15 (hereafter referred to as "the Act"), may assign its rights to be paid amounts due or to become due as a result of the performance of this contract to a bank, trust company, or other financing institution, including any Federal lending agency. The assignee under such an assignment may thereafter further assign or reassign its right under the original assignment to any type of financing institution described in the preceding sentence.

(b) Any assignment or reassignment authorized under the Act and this clause shall cover all unpaid amounts payable under this contract, and shall not be made to more than one party, except that an assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in the financing of this contract.

(c) The Contractor shall not furnish or disclose to any assignee under this contract any classified document (including this contract) or information related to work under this contract until the Contracting Officer authorizes such action in writing.

#### **88. \*FAR 52.232-26 PROMPT PAYMENT FOR FIXED-PRICE ARCHITECT-ENGINEER CONTRACTS (FEB 2002)**

Notwithstanding any other payment terms in this contract, the Government will make invoice payments under the terms and conditions specified in this clause. The Government considers payment as being made on the day a check is dated or the date of an electronic funds transfer. Definitions of pertinent terms are set forth in sections 2.101, 32.001, and 32.902 of the Federal Acquisition Regulation. All days referred to in this clause are calendar days, unless otherwise specified. (However, see paragraph (a)(3) of this clause concerning payments due on Saturdays, Sundays, and legal holidays.)

(a) *Invoice payments*—(1) *Due date*. The due date for making invoice payments is—

(i) For work or services completed by the Contractor, the later of the following two events:

(A) The 30th day after the designated billing office receives a proper invoice from the Contractor (except as provided in paragraph (a)(1)(iii) of this clause).

(B) The 30th day after Government acceptance of the work or services

completed by the Contractor. For a final invoice, when the payment amount is subject to contract settlement actions (e.g., release of claims), acceptance is deemed to occur on the effective date of the settlement.

(ii) The due date for progress payments is the 30th day after Government approval of Contractor estimates of work or services accomplished.

(iii) If the designated billing office fails to annotate the invoice or payment request with the actual date of receipt at the time of receipt, the payment due date is the 30th day after the date of the Contractor's invoice or payment request, provided the designated billing office receives a proper invoice or payment request and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(2) *Contractor's invoice.* The Contractor shall prepare and submit invoices to the designated billing office specified in the contract. A proper invoice must include the items listed in paragraphs (a)(2)(i) through (a)(2)(x) of this clause. If the invoice does not comply with these requirements, the designated billing office will return it within 7 days after receipt, with the reasons why it is not a proper invoice. When computing any interest penalty owed the Contractor, the Government will take into account if the Government notifies the Contractor of an improper invoice in an untimely manner.

(i) Name and address of the Contractor.

(ii) Invoice date and invoice number. (The Contractor should date invoices as close as possible to the date of mailing or transmission.)

(iii) Contract number or other authorization for work or services performed (including order number and contract line item number).

(iv) Description of work or services performed.

(v) Delivery and payment terms (e.g., discount for prompt payment terms).

(vi) Name and address of Contractor official to whom payment is to be sent (must be the same as that in the contract or in a proper notice of assignment).

(vii) Name (where practicable), title, phone number, and mailing address of person to notify in the event of a defective invoice.

(viii) Taxpayer Identification Number (TIN). The Contractor shall include its TIN on the invoice only if required elsewhere in this contract.

(ix) Electronic funds transfer (EFT) banking information.

(A) The Contractor shall include EFT banking information on the invoice only if required elsewhere in this contract.

(B) If EFT banking information is not required to be on the invoice, in order for the invoice to be a proper invoice, the Contractor shall have submitted correct EFT banking information in accordance with the applicable solicitation provision (e.g., 52.232–38, Submission of Electronic Funds Transfer Information with Offer), contract clause (e.g., 52.232–33, Payment by Electronic Funds Transfer—Central Contractor Registration, or 52.232–34, Payment by Electronic Funds Transfer—Other Than Central Contractor Registration), or applicable agency procedures.

(C) EFT banking information is not required if the Government waived the requirement to pay by EFT.

(x) Any other information or documentation required by the contract.

(3) *Interest penalty.* The designated payment office will pay an interest penalty automatically, without request from the Contractor, if payment is not made by the due date and the conditions listed in paragraphs (a)(3)(i) through (a)(3)(iii) of this clause are met, if applicable. However, when the due date falls on a Saturday, Sunday, or legal holiday, the designated payment office may make payment on the following working day without incurring a late payment interest penalty.

(i) The designated billing office received a proper invoice.

(ii) The Government processed a receiving report or other Government documentation authorizing payment and there was no disagreement over quantity, quality, Contractor compliance with any contract term or condition, or requested progress payment amount.

(iii) In the case of a final invoice for any balance of funds due the Contractor for work or services performed, the amount was not subject to further contract settlement actions between the Government and the Contractor.

(4) *Computing penalty amount.* The Government will compute the interest penalty in accordance with the Office of Management and Budget prompt payment regulations at 5 CFR part 1315.

(i) For the sole purpose of computing an interest penalty that might be due the

Contractor, Government acceptance or approval is deemed to occur constructively as shown in paragraphs (a)(4)(i)(A) and (B) of this clause. If actual acceptance or approval occurs within the constructive acceptance or approval period, the Government will base the determination of an interest penalty on the actual date of acceptance or approval. Constructive acceptance or constructive approval requirements do not apply if there is a disagreement over quantity, quality, Contractor compliance with a contract provision, or requested progress payment amounts. These requirements also do not compel Government officials to accept work or services, approve Contractor estimates, perform contract administration functions, or make payment prior to fulfilling their responsibilities.

(A) For work or services completed by the Contractor, Government acceptance is deemed to occur constructively on the 7th day after the Contractor completes the work or services in accordance with the terms and conditions of the contract.

(B) For progress payments, Government approval is deemed to occur on the 7th day after the designated billing office receives the Contractor estimates.

(ii) The prompt payment regulations at 5 CFR 1315.10(c) do not require the Government to pay interest penalties if payment delays are due to disagreement between the Government and the Contractor over the payment amount or other issues involving contract compliance, or on amounts temporarily withheld or retained in accordance with the terms of the contract. The Government and the Contractor shall resolve claims involving disputes, and any interest that may be payable in accordance with the clause at FAR 52.233-1, Disputes.

(5) *Discounts for prompt payment.* The designated payment office will pay an interest penalty automatically, without request from the Contractor, if the Government takes a discount for prompt payment improperly. The Government will calculate the interest penalty in accordance with 5 CFR part 1315.

(6) *Additional interest penalty*

(i) The designated payment office will pay a penalty amount, calculated in accordance with the prompt payment regulations at 5 CFR part 1315, in addition to the interest penalty amount only if—

(A) The Government owes an interest penalty of \$1 or more;

(B) The designated payment office does not pay the interest penalty within 10 days after the date the invoice amount is paid; and

(C) The contractor makes a written demand to the designated payment office for additional penalty payment, in accordance with paragraph (a)(6)(ii) of this clause, postmarked not later than 40 days after the date the invoice amount is paid.

(ii)(A) The Contractor shall support written demands for additional penalty payments with the following data. The Government will not request any additional data. The Contractor shall—

(1) Specifically assert that late payment interest is due under a specific invoice, and request payment of all overdue late payment interest penalty and such additional penalty as may be required;

(2) Attach a copy of the invoice on which the unpaid late payment interest is due; and

(3) State that payment of the principal has been received, including the date of receipt.

(B) If there is no postmark or the postmark is illegible—

(1) The designated payment office that receives the demand will annotate it with the date of receipt, provided the demand is received on or before the 40th day after payment was made; or

(2) If the designated payment office fails to make the required annotation, the Government will determine the demand's validity based on the date the Contractor has placed on the demand, provided such date is no later than the 40th day after payment was made.

(iii) The additional penalty does not apply to payments regulated by other Government regulations (e.g., payments under utility contracts subject to tariffs and regulation).

(b) *Contract financing payments.* If this contract provides for contract financing, the Government will make contract financing payments in accordance with the applicable contract financing clause.

(c) *Overpayments.* If the Contractor becomes aware of a duplicate payment or that the Government has otherwise overpaid on an invoice payment, the Contractor shall immediately notify the Contracting Officer and request instructions for disposition of the overpayment. (End of clause)

**89. \*FAR 52.232-27 PROMPT PAY FOR CONSTRUCTION CONTRACTS (FEB 2002)**

Notwithstanding any other payment terms in this contract, the Government will make invoice payments under the terms and conditions specified in this clause. The Government considers payment as being made on the day a check is dated or the date of an electronic funds transfer. Definitions of pertinent terms are set forth in sections 2.101, 32.001, and 32.902 of the Federal Acquisition Regulation. All days referred to in this clause are calendar days, unless otherwise specified. (However, see paragraph (a)(3) concerning payments due on Saturdays, Sundays, and legal holidays.)

(a) *Invoice payments*—(1) *Types of invoice payments*. For purposes of this clause, there are several types of invoice payments that may occur under this contract, as follows:

(i) Progress payments, if provided for elsewhere in this contract, based on Contracting Officer approval of the estimated amount and value of work or services performed, including payments for reaching milestones in any project.

(A) The due date for making such payments is 14 days after the designated billing office receives a proper payment request. If the designated billing office fails to annotate the payment request with the actual date of receipt at the time of receipt, the payment due date is the 14th day after the date of the Contractor's payment request, provided the designated billing office receives a proper payment request and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(B) The due date for payment of any amounts retained by the Contracting Officer in accordance with the clause at 52.232-5, Payments Under Fixed-Price Construction Contracts, is as specified in the contract or, if not specified, 30 days after approval by the Contracting Officer for release to the Contractor.

(ii) Final payments based on completion and acceptance of all work and presentation of release of all claims against the Government arising by virtue of the contract, and payments for partial deliveries that have been accepted by the Government (e.g., each separate building, public work, or other division of the contract for which the price is stated separately in the contract).

(A) The due date for making such payments is the later of the following two events:

(1) The 30th day after the designated billing office receives a proper invoice from the Contractor.

(2) The 30th day after Government acceptance of the work or services completed by the Contractor. For a final invoice when the payment amount is subject to contract settlement actions (e.g., release of claims), acceptance is deemed to occur on the effective date of the contract settlement.

(B) If the designated billing office fails to annotate the invoice with the date of actual receipt at the time of receipt, the invoice payment due date is the 30th day after the date of the Contractor's invoice, provided the designated billing office receives a proper invoice and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(2) *Contractor's invoice*. The Contractor shall prepare and submit invoices to the designated billing office specified in the contract. A proper invoice must include the items listed in paragraphs (a)(2)(i) through (a)(2)(xi) of this clause. If the invoice does not comply with these requirements, the designated billing office must return it within 7 days after receipt, with the reasons why it is not a proper invoice. When computing any interest penalty owed the Contractor, the Government will take into account if the Government notifies the Contractor of an improper invoice in an untimely manner.

(i) Name and address of the Contractor.

(ii) Invoice date and invoice number. (The Contractor should date invoices as close as possible to the date of mailing or transmission.)

(iii) Contract number or other authorization for work or services performed (including order number and contract line item number).

(iv) Description of work or services performed.

(v) Delivery and payment terms (e.g., discount for prompt payment terms).

(vi) Name and address of Contractor official to whom payment is to be sent (must be the

same as that in the contract or in a proper notice of assignment).

(vii) Name (where practicable), title, phone number, and mailing address of person to notify in the event of a defective invoice.

(viii) For payments described in paragraph (a)(1)(i) of this clause, substantiation of the amounts requested and certification in accordance with the requirements of the clause at 52.232-5, Payments Under Fixed-Price Construction Contracts.

(ix) Taxpayer Identification Number (TIN). The Contractor shall include its TIN on the invoice only if required elsewhere in this contract.

(x) Electronic funds transfer (EFT) banking information.

(A) The Contractor shall include EFT banking information on the invoice only if required elsewhere in this contract.

(B) If EFT banking information is not required to be on the invoice, in order for the invoice to be a proper invoice, the Contractor shall have submitted correct EFT banking information in accordance with the applicable solicitation provision (e.g., 52.232-38, Submission of Electronic Funds Transfer Information with Offer), contract clause (e.g., 52.232-33, Payment by Electronic Funds Transfer—Central Contractor Registration, or 52.232-34, Payment by Electronic Funds Transfer—Other Than Central Contractor Registration), or applicable agency procedures.

(C) EFT banking information is not required if the Government waived the requirement to pay by EFT.

(xi) Any other information or documentation required by the contract.

(3) *Interest penalty.* The designated payment office will pay an interest penalty automatically, without request from the Contractor, if payment is not made by the due date and the conditions listed in paragraphs (a)(3)(i) through (a)(3)(iii) of this clause are met, if applicable. However, when the due date falls on a Saturday, Sunday, or legal holiday, the designated payment office may make payment on the following working day without incurring a late payment interest penalty.

(i) The designated billing office received a proper invoice.

(ii) The Government processed a receiving report or other Government documentation authorizing payment and there was no disagreement over quantity, quality, Contractor compliance with any contract term or condition, or requested progress payment amount.

(iii) In the case of a final invoice for any balance of funds due the Contractor for work or services performed, the amount was not subject to further contract settlement actions between the Government and the Contractor.

(4) *Computing penalty amount.* The Government will compute the interest penalty in accordance with the Office of Management and Budget prompt payment regulations at 5 CFR part 1315.

(i) For the sole purpose of computing an interest penalty that might be due the Contractor for payments described in paragraph (a)(1)(ii) of this clause, Government acceptance or approval is deemed to occur constructively on the 7th day after the Contractor has completed the work or services in accordance with the terms and conditions of the contract. If actual acceptance or approval occurs within the constructive acceptance or approval period, the Government will base the determination of an interest penalty on the actual date of acceptance or approval. Constructive acceptance or constructive approval requirements do not apply if there is a disagreement over quantity, quality, or Contractor compliance with a contract provision. These requirements also do not compel Government officials to accept work or services, approve Contractor estimates, perform contract administration functions, or make payment prior to fulfilling their responsibilities.

(ii) The prompt payment regulations at 5 CFR 1315.10(c) do not require the Government to pay interest penalties if payment delays are due to disagreement between the Government and the Contractor over the payment amount or other issues involving contract compliance, or on amounts temporarily withheld or retained in accordance with the terms of the contract. The Government and the Contractor shall resolve claims involving disputes, and any interest that may be payable in accordance with the clause at FAR 52.233-1, Disputes.

(5) *Discounts for prompt payment.* The designated payment office will pay an interest penalty automatically, without request from the Contractor, if the Government takes a discount for prompt payment improperly. The Government will calculate the interest penalty in accordance with the prompt payment regulations at 5 CFR part 1315.

(6) *Additional interest penalty.* (i) The designated payment office will pay a penalty amount,

calculated in accordance with the prompt payment regulations at 5 CFR part 1315 in addition to the interest penalty amount only if—

(A) The Government owes an interest penalty of \$1 or more;

(B) The designated payment office does not pay the interest penalty within 10 days after the date the invoice amount is paid; and

(C) The Contractor makes a written demand to the designated payment office for additional penalty payment, in accordance with paragraph (a)(6)(ii) of this clause, postmarked not later than 40 days after the date the invoice amount is paid.

(ii)(A) The Contractor shall support written demands for additional penalty payments with the following data. The Government will not request any additional data. The Contractor shall—

(1) Specifically assert that late payment interest is due under a specific invoice, and request payment of all overdue late payment interest penalty and such additional penalty as may be required;

(2) Attach a copy of the invoice on which the unpaid late payment interest was due; and

(3) State that payment of the principal has been received, including the date of receipt.

(B) If there is no postmark or the postmark is illegible—

(1) The designated payment office that receives the demand will annotate it with the date of receipt provided the demand is received on or before the 40th day after payment was made; or

(2) If the designated payment office fails to make the required annotation, the Government will determine the demand's validity based on the date the Contractor has placed on the demand, provided such date is no later than the 40th day after payment was made.

(b) *Contract financing payments.* If this contract provides for contract financing, the Government will make contract financing payments in accordance with the applicable contract financing clause.

(c) *Subcontract clause requirements.* The Contractor shall include in each subcontract for property or services (including a material supplier) for the purpose of performing this contract the following:

(1) *Prompt payment for subcontractors.* A payment clause that obligates the Contractor to pay the subcontractor for satisfactory performance under its subcontract not later than 7 days from receipt of payment out of such amounts as are paid to the Contractor under this contract.

(2) *Interest for subcontractors.* An interest penalty clause that obligates the Contractor to pay to the subcontractor an interest penalty for each payment not made in accordance with the payment clause—

(i) For the period beginning on the day after the required payment date and ending on the date on which payment of the amount due is made; and

(ii) Computed at the rate of interest established by the Secretary of the Treasury, and published in the **Federal Register**, for interest payments under section 12 of the Contract Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty.

(3) *Subcontract clause flowdown.* A clause requiring each subcontractor to

(i) Include a payment clause and an interest penalty clause conforming to the standards set forth in paragraphs (c)(1) and (c)(2) of this clause in each of its subcontracts; and

(ii) Require each of its subcontractors to include such clauses in their subcontracts with each lower-tier subcontractor or supplier.

(d) *Subcontract clause interpretation.* The clauses required by paragraph (c) of this clause shall not be construed to impair the right of the Contractor or a subcontractor at any tier to negotiate, and to include in their subcontract, provisions that—

(1) *Retainage permitted.* Permit the Contractor or a subcontractor to retain (without cause) a specified percentage of each progress payment otherwise due to a subcontractor for satisfactory performance under the subcontract without incurring any obligation to pay a late payment interest penalty, in accordance with terms and conditions agreed to by the parties to the subcontract, giving such recognition as the parties deem appropriate to the ability of a subcontractor to furnish a performance bond and a payment bond;

(2) *Withholding permitted.* Permit the Contractor or subcontractor to make a determination that part or all of the subcontractor's request for payment may be withheld in accordance with the subcontract agreement; and

(3) *Withholding requirements.* Permit such withholding without incurring any obligation to pay a late payment penalty if—

(i) A notice conforming to the standards of paragraph (g) of this clause previously has been furnished to the subcontractor; and

(ii) The Contractor furnishes to the Contracting Officer a copy of any notice issued by a Contractor pursuant to paragraph (d)(3)(i) of this clause.

(e) *Subcontractor withholding procedures.* If a Contractor, after making a request for payment to the Government but before making a payment to a subcontractor for the subcontractor's performance covered by the payment request, discovers that all or a portion of the payment otherwise due such subcontractor is subject to withholding from the subcontractor in accordance with the subcontract agreement, then the Contractor shall—

(1) *Subcontractor notice.* Furnish to the subcontractor a notice conforming to the standards of paragraph (g) of this clause as soon as practicable upon ascertaining the cause giving rise to a withholding, but prior to the due date for subcontractor payment;

(2) *Contracting Officer notice.* Furnish to the Contracting Officer, as soon as practicable, a copy of the notice furnished to the subcontractor pursuant to paragraph (e)(1) of this clause;

(3) *Subcontractor progress payment reduction.* Reduce the subcontractor's progress payment by an amount not to exceed the amount specified in the notice of withholding furnished under paragraph (e)(1) of this clause;

(4) *Subsequent subcontractor payment.* Pay the subcontractor as soon as practicable after the correction of the identified subcontract performance deficiency, and—

(i) Make such payment within—

(A) Seven days after correction of the identified subcontract performance deficiency (unless the funds therefor must be recovered from the Government because of a reduction under paragraph (e)(5)(i) of this clause; or

(B) Seven days after the Contractor recovers such funds from the Government;

or

(ii) Incur an obligation to pay a late payment interest penalty computed at the rate of interest established by the Secretary of the Treasury, and published in the **Federal Register**, for interest payments under section 12 of the Contracts Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty;

(5) *Notice to Contracting Officer.* Notify the Contracting Officer upon—

(i) Reduction of the amount of any subsequent certified application for payment; or

(ii) Payment to the subcontractor of any withheld amounts of a progress payment,

specifying—

(A) The amounts withheld under paragraph (e)(1) of this clause; and

(B) The dates that such withholding began and ended; and

(6) *Interest to Government.* Be obligated to pay to the Government an amount equal to interest on the withheld payments (computed in the manner provided in 31 U.S.C. 3903(c)(1)), from the 8th day after receipt of the withheld amounts from the Government until—

(i) The day the identified subcontractor performance deficiency is corrected; or

(ii) The date that any subsequent payment is reduced under paragraph (e)(5)(i) of this

clause.

(f) *Third-party deficiency reports—*(1) *Withholding from subcontractor.* If a Contractor, after making payment to a first-tier subcontractor, receives from a supplier or subcontractor of the first-tier subcontractor (hereafter referred to as a "second-tier subcontractor") a written notice in accordance with section 2 of the Act of August 24, 1935 (40 U.S.C. 270b, Miller Act), asserting a deficiency in such first-tier subcontractor's performance under the contract for which the Contractor may be ultimately liable, and the Contractor determines that all or a portion of future payments otherwise due such first-tier subcontractor is subject to withholding in accordance with the subcontract agreement, the Contractor may, without incurring an obligation to pay an interest penalty under paragraph (e)(6) of this clause—

(i) Furnish to the first-tier subcontractor a notice conforming to the standards of paragraph (g) of this clause as soon as practicable upon making such determination; and

(ii) Withhold from the first-tier subcontractor's next available progress payment or payments an amount not to exceed the amount specified in the notice of withholding furnished under paragraph

(f)(1)(i) of this clause.

(2) *Subsequent payment or interest charge.* As soon as practicable, but not later than 7 days after receipt of satisfactory written notification that the identified subcontract performance deficiency has been corrected, the Contractor shall—

(i) Pay the amount withheld under paragraph (f)(1)(ii) of this clause to such first-tier subcontractor; or

(ii) Incur an obligation to pay a late payment interest penalty to such first-tier subcontractor computed at the rate of interest established by the Secretary of the Treasury, and published in the **Federal Register**, for interest payments under section 12 of the Contracts Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty.

(g) *Written notice of subcontractor withholding.* The Contractor shall issue a written notice of any withholding to a subcontractor (with a copy furnished to the Contracting Officer), specifying—

(1) The amount to be withheld;

(2) The specific causes for the withholding under the terms of the subcontract; and

(3) The remedial actions to be taken by the subcontractor in order to receive payment of the amounts withheld.

(h) *Subcontractor payment entitlement.* The Contractor may not request payment from the Government of any amount withheld or retained in accordance with paragraph (d) of this clause until such time as the Contractor has determined and certified to the Contracting Officer that the subcontractor is entitled to the payment of such amount.

(i) *Prime-subcontractor disputes.* A dispute between the Contractor and subcontractor relating to the amount or entitlement of a subcontractor to a payment or a late payment interest penalty under a clause included in the subcontract pursuant to paragraph (c) of this clause does not constitute a dispute to which the Government is a party. The Government may not be interpleaded in any judicial or administrative proceeding involving such a dispute.

(j) *Preservation of prime-subcontractor rights.* Except as provided in paragraph (i) of this clause, this clause shall not limit or impair any contractual, administrative, or judicial remedies otherwise available to the Contractor or a subcontractor in the event of a dispute involving late payment or nonpayment by the Contractor or deficient subcontract performance or nonperformance by a subcontractor.

(k) *Non-recourse for prime contractor interest penalty.* The Contractor's obligation to pay an interest penalty to a subcontractor pursuant to the clauses included in a subcontract under paragraph (c) of this clause shall not be construed to be an obligation of the Government for such interest penalty. A cost-reimbursement claim may not include any amount for reimbursement of such interest penalty.

(l) *Overpayments.* If the Contractor becomes aware of a duplicate payment or that the Government has otherwise overpaid on an invoice payment, the Contractor shall immediately notify the Contracting Officer and request instructions for disposition of the overpayment.

(End of clause)

#### **90. \*FAR 52.232-33 PAYMENT BY ELECTRONIC FUNDS TRANSFER –CENTRAL CONTRACTOR REGISTRATION (MAY 1999)**

(a) *Method of payment.* (1) All payments by the Government under this contract shall be made by electronic funds transfer (EFT), except as provided in paragraph (a)(2) of this clause. As used in this clause, the term "EFT" refers to the funds transfer and may also include the payment information transfer.

(2) In the event the Government is unable to release one or more payments by EFT, the Contractor agrees to either—

(i) Accept payment by check or some other mutually agreeable method of payment; or

(ii) Request the Government to extend the payment due date until such time as the Government can make payment by EFT (but see paragraph (d) of this clause).

(b) *Contractor's EFT information.* The Government shall make payment to the Contractor using the EFT information contained in the Central Contractor Registration (CCR) database. In the event that the EFT information changes, the Contractor shall be responsible for providing the updated information to the CCR database.

(c) *Mechanisms for EFT payment.* The Government may make payment by EFT through either the Automated Clearing House (ACH) network, subject to the rules of the National Automated Clearing House



Association, or the Fedwire Transfer System. The rules governing Federal payments through the ACH are contained in 31 CFR part 210.

(d) *Suspension of payment.* If the Contractor's EFT information in the CCR database is incorrect, then the Government need not make payment to the Contractor under this contract until correct EFT information is entered into the CCR database; and any invoice or contract financing request shall be deemed not to be a proper invoice for the purpose of prompt payment under this contract. The prompt payment terms of the contract regarding notice of an improper invoice and delays in accrual of interest penalties apply.

(e) *Contractor EFT arrangements.* If the Contractor has identified multiple payment receiving points (i.e., more than one remittance address and/or EFT information set) in the CCR database, and the Contractor has not notified the Government of the payment receiving point applicable to this contract, the Government shall make payment to the first payment receiving point (EFT information set or remittance address as applicable) listed in the CCR database.

(f) *Liability for uncompleted or erroneous transfers.* (1) If an uncompleted or erroneous transfer occurs because the Government used

the Contractor's EFT information incorrectly, the Government remains responsible for—

- (i) Making a correct payment;
- (ii) Paying any prompt payment penalty due; and
- (iii) Recovering any erroneously directed funds.

(2) If an uncompleted or erroneous transfer occurs because the Contractor's EFT information was incorrect, or was revised within 30 days of Government release of the EFT payment transaction instruction to the Federal Reserve System, and—

(i) If the funds are no longer under the control of the payment office, the Government is deemed to have made payment and the Contractor is responsible for recovery of any erroneously directed funds; or

(ii) If the funds remain under the control of the payment office, the Government shall not make payment, and the provisions of paragraph (d) of this clause shall apply.

(g) *EFT and prompt payment.* A payment shall be deemed to have been made in a timely manner in accordance with the prompt payment terms of this contract if, in the EFT payment transaction instruction released to the Federal Reserve System, the date specified for settlement of the payment is on or before the prompt payment due date, provided the specified payment date is a valid date under the rules of the Federal Reserve System.

(h) *EFT and assignment of claims.* If the Contractor assigns the proceeds of this contract as provided for in the assignment of claims terms of this contract, the Contractor shall require as a condition of any such assignment, that the assignee shall register in the CCR database and shall be paid by EFT in accordance with the terms of this clause. In all respects, the requirements of this clause shall apply to the assignee as if it were the Contractor. EFT information that shows the ultimate recipient of the transfer to be other than the Contractor, in the absence of a proper assignment of claims acceptable to the Government, is incorrect EFT information within the meaning of paragraph (d) of this clause.

(i) *Liability for change of EFT information by financial agent.* The Government is not liable for errors resulting from changes to EFT information made by the Contractor's financial agent.

(j) *Payment information.* The payment or disbursing office shall forward to the Contractor available payment information that is suitable for transmission as of the date of release of the EFT instruction to the Federal Reserve System. The Government may request the Contractor to designate a desired format and method(s) for delivery of payment information from a list of formats and methods the payment office is capable of executing. However, the Government does not guarantee that any particular format or method of delivery is available at any particular payment office and retains the latitude to use the format and delivery method most convenient to the Government. If the Government makes payment by check in accordance with paragraph (a) of this clause, the Government shall mail the payment information to the remittance address contained in the CCR database.  
(End of Clause)

#### **91. DFARS 252.232-7004**

#### **DOD PROGRESS PAYMENT RATES (OCT 2001)**

(a) If the contractor is a small business concern, the Progress Payments clause of this contract is modified

to change each mention of the progress payment rate and liquidation rate (excepting paragraph (k), *Limitations on Undefined Contract Actions*) to 90 percent.

(b) If the contractor is a small disadvantaged business concern, the Progress Payments clause of this contract is modified to change each mention of the progress payment rate and liquidation rate (excepting paragraph (k), *Limitations on Undefined Contract Actions*) to 95 percent.  
(End of clause)

**92. DFARS 252.232-7005 REIMBURSEMENT OF SUBCONTRACTOR ADVANCE PAYMENTS--  
DOD PILOT MENTOR-PROTEGE PROGRAM (SEP 2001)**

(a) The Government will reimburse the Contractor for any advance payments made by the Contractor, as a mentor firm, to a protege firm, pursuant to an approved mentor-protege agreement, provided-

(1) The Contractor's subcontract with the protege firm includes a provision substantially the same as FAR 52.232-12, Advance Payments;

(2) The Contractor has administered the advance payments in accordance with the policies of FAR Subpart 32.4; and

(3) The Contractor agrees that any financial loss resulting from the failure or inability of the protege firm to repay any unliquidated advance payments is the sole financial responsibility of the Contractor.

(b) For a fixed price type contract, advance payments made to a protege firm shall be paid and administered as if they were 100 percent progress payments. The Contractor shall include as a separate attachment with each Standard Form (SF) 1443, Contractor's Request for Progress Payment, a request for reimbursement of advance payments made to a protege firm. The attachment shall provide a separate calculation of lines 14a through 14e of SF 1443 for each protege, reflecting the status of advance payments made to that protege.

(c) For cost reimbursable contracts, reimbursement of advance payments shall be made via public voucher. The Contractor shall show the amounts of advance payments made to each protege on the public voucher, in the form and detail directed by the cognizant contracting officer or contract auditor.  
(End of clause)

**93. \*FAR 52.233-1 DISPUTES (DEC 1998)**

(a) This contract is subject to the Contract Disputes Act of 1978, as amended (41 U.S.C. 601-613).

(b) Except as provided in the Act, all disputes arising under or relating to this contract shall be resolved under this clause.

(c) 'Claim,' as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to this contract. A claim arising under a contract, unlike a claim relating to that contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant. However, a written demand or written assertion by the Contractor seeking the payment of money exceeding \$100,000 is not a claim under the Act until certified as required by subparagraph (d)(2) of this clause. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim under the Act. The submission may be converted to a claim under the Act, by complying with the submission and certification requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.

(d)(1) A claim by the Contractor shall be made in writing and, unless otherwise stated in this contract, submitted within 6 years after accrual of the claim to the Contracting Officer for a written decision. A claim by the Government against the Contractor shall be subject to a written decision by the Contracting Officer.

(2) (i) Contractors shall provide the certification specified in paragraph (d)(2)(iii) of this clause when submitting any claim exceeding \$100,000.

(ii) The certification requirement does not apply to issues in controversy that have not been submitted as all or part of a claim.

(iii) The certification shall state as follows:

'I certify that the claim is made in good faith; that the supporting data are accurate and complete to the best of my knowledge and belief; that the amount requested accurately reflects the contract adjustment for which the Contractor believes the Government is liable; and that I am duly authorized to certify the claim on behalf of the Contractor.'

(3) The certification may be executed by any person duly authorized to bind the Contractor with respect to the claim.

(e) For Contractor claims of \$100,000 or less, the Contracting Officer must, if requested in writing by the Contractor, render a decision within 60 days of the request. For Contractor-certified claims over \$100,000, the Contracting Officer must, within 60 days, decide the claim or notify the Contractor of the date by which the decision will be made.

(f) The Contracting Officer's decision shall be final unless the Contractor appeals or files a suit as provided in the Act.

(g) If the claim by the Contractor is submitted to the Contracting Officer or a claim by the Government is presented to the Contractor, the parties, by mutual consent, may agree to use alternative dispute resolution (ADR). If the Contractor refuses an offer for ADR, the Contractor shall inform the Contracting Officer, in writing, of the Contractor's specific reasons for rejecting the offer.

(h) The Government shall pay interest on the amount found due and unpaid from (1) the date the Contracting Officer receives the claim (certified if required), or (2) the date that payment otherwise would be due, if that date is later, until the date of payment. With regard to claims having defective certifications, as defined in (FAR) 48 CFR 33.201, interest shall be paid from the date that the Contracting Officer initially receives the claim. Simple interest on claims shall be paid at the rate, fixed by the Secretary of the Treasury as provided in the Act, which is applicable to the period during which the Contracting Officer receives the claim and then at the rate applicable for each 6-month period as fixed by the Treasury Secretary during the pendency of the claim.

(i) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under the contract, and comply with any decision of the Contracting Officer.

#### **94. \*FAR 52.233-11 DISPUTES (DEC 1998) ALTERNATE I (DEC 1991)**

(a) This contract is subject to the Contract Disputes Act of 1978, as amended (41 U.S.C. 601-613).

(b) Except as provided in the Act, all disputes arising under or relating to this contract shall be resolved under this clause.

(c) "Claim," as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to this contract. A claim arising under a contract, unlike a claim relating to that contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant. However, a written demand or written assertion by the Contractor seeking the payment of money exceeding \$100,000 is not a claim under the Act until certified as required by subparagraph (d)(2) of this clause. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim under the Act. The submission may be converted to a claim under the Act, by complying with the submission and certification requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.

(d)(1) A claim by the Contractor shall be made in writing and, unless otherwise stated in this contract, submitted within 6 years after accrual of the claim to the Contracting Officer for a written decision. A claim by the Government against the Contractor shall be subject to a written decision by the Contracting Officer.

(2) (i) Contractors shall provide the certification specified in paragraph (d)(2)(iii) of this clause when submitting any claim exceeding \$100,000.

(ii) The certification requirement does not apply to issues in controversy that have not been submitted as all or part of a claim.

(iii) The certification shall state as follows: "I certify that the claim is made in good faith; that the supporting data are accurate and complete to the best of my knowledge and belief; that the amount requested accurately reflects the contract adjustment for which the Contractor believes the Government is liable; and that I am duly authorized to certify the claim on behalf of the Contractor."

(3) The certification may be executed by any person duly authorized to bind the Contractor with respect to the claim.

(e) For Contractor claims of \$100,000 or less, the Contracting Officer must, if requested in writing by the Contractor, render a decision within 60 days of the request. For Contractor-certified claims over \$100,000, the Contracting Officer must, within 60 days, decide the claim or notify the Contractor of the date by which the decision will be made.

(f) The Contracting Officer's decision shall be final unless the Contractor appeals or files a suit as provided in the Act.

(g) If the claim by the Contractor is submitted to the Contracting Officer or a claim by the Government is presented to the Contractor, the parties, by mutual consent, may agree to use alternative dispute resolution (ADR). If the Contractor refuses an offer for ADR, the Contractor shall inform the Contracting Officer, in writing, of the Contractor's specific reasons for rejecting the offer.

(h) The Government shall pay interest on the amount found due and unpaid from (1) the date that the Contracting Officer receives the claim (certified, if required); or (2) the date that payment otherwise would be due, if that date is later, until the date of payment. With regard to claims having defective certifications, as defined in FAR 33.201, interest shall be paid from the date that the Contracting Officer initially receives the claim. Simple interest on claims shall be paid at the rate, fixed by the Secretary of the Treasury as provided in the Act, which is applicable to the period during which the Contracting Officer receives the claim and then at the rate applicable for each 6-month period as fixed by the Treasury Secretary during the pendency of the claim.

(i) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under or relating to the contract, and comply with any decision of the Contracting Officer. (End of clause)

**95. \*FAR 52.233-3 PROTEST AFTER AWARD (AUG 1996)**

(a) Upon receipt of a notice of protest (as defined in FAR 33.101) or a determination that a protest is likely (see FAR 33.102(d)), the Contracting Officer may, by written order to the Contractor, direct the Contractor to stop performance of the work called for by this contract. The order shall be specifically identified as a stop-work order issued under this clause. Upon receipt of the order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Upon receipt of the final decision in the protest, the Contracting Officer shall either--

(1) Cancel the stop-work order; or

(2) Terminate the work covered by the order as provided in the Default, or the Termination for Convenience of the Government, clause of this contract.

(b) If a stop-work order issued under this clause is canceled either before or after a final decision in the protest, the Contractor shall resume work. The Contracting Officer shall make an equitable adjustment in the delivery schedule or contract price, or both, and the contract shall be modified, in writing, accordingly, if--

(1) The stop-work order results in an increase in the time required for, or in the Contractor's cost properly allocable to, the performance of any part of this contract; and

(2) The Contractor asserts its right to an adjustment within 30 days after the end of the period of work stoppage; provided, that if the Contracting Officer decides the facts justify the action, the Contracting Officer may receive and act upon a proposal at any time before final payment under this contract.

(c) If a stop-work order is not canceled and the work covered by the order is terminated for the convenience of the Government, the Contracting Officer shall allow reasonable costs resulting from the stop-work order in arriving at the termination settlement.

(d) If a stop-work order is not canceled and the work covered by the order is terminated for default, the Contracting Officer shall allow, by equitable adjustment or otherwise, reasonable costs resulting from the stop-work order.

(e) The Government's rights to terminate this contract at any time are not affected by action taken under this clause.

(f) If, as the result of the Contractor's intentional or negligent misstatement, misrepresentation, or miscertification, a protest related to this contract is sustained, and the Government pays costs, as provided in FAR 33.102(b)(2) or 33.104(h)(1), the Government may require the Contractor to reimburse the Government the amount

of such costs. In addition to any other remedy available, and pursuant to the requirements of Subpart 32.6, the Government may collect this debt by offsetting the amount against any payment due the Contractor under any contract between the Contractor and the Government.

**96. RESERVED.**

**97. FAR 52.236-2 DIFFERING SITE CONDITIONS (APR 1984)**

(a) The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Contracting Officer of

(1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or

(2) unknown physical conditions at the site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in the contract.

(b) The Contracting Officer shall investigate the site conditions promptly after receiving the notice. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, an equitable adjustment shall be made under this clause and the contract modified in writing accordingly.

(c) No request by the Contractor for an equitable adjustment to the contract under this clause shall be allowed, unless the Contractor has given the written notice required, provided, that the time prescribed in (a) above for giving written notice may be extended by the Contracting Officer.

(d) No request by the Contractor for an equitable adjustment to the contract for differing site conditions shall be allowed if made after final payment under this contract.

**98. \*FAR 52.236-3 SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK (APR 1984)**

(a) The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to

(1) conditions bearing upon transportation, disposal, handling, and storage of materials;

(2) the availability of labor, water, electric power, and roads;

(3) uncertainties of weather, river stages, tides, or similar physical conditions at the site;

(4) the conformation and conditions of the ground; and

(5) the character of equipment and facilities needed preliminary to and during work

performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the Government, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the Government.

(b) The Government assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the Government. Nor does the Government assume responsibility for any understanding reached or representation made concerning conditions which can affect the work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in this contract.

**99. \*FAR 52.236-5 MATERIAL AND WORKMANSHIP (APR 1984)**

(a) All equipment, material, and articles incorporated into the work covered by this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. References in the specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of the Contracting Officer, is equal to that named in the specifications, unless otherwise specifically provided in this contract.

(b) The Contractor shall obtain the Contracting Officer's approval of the machinery and mechanical and other equipment to be incorporated into the work. When requesting approval, the Contractor shall furnish to the Contracting Officer the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the machinery and mechanical and other equipment. When required by this contract or by the Contracting Officer, the Contractor shall also obtain the Contracting Officer's approval of the material or articles which the Contractor contemplates incorporating into the work. When requesting approval, the Contractor shall provide full information concerning the material or articles. When directed to do so, the Contractor shall submit samples for approval at the Contractor's expense, with all shipping charges prepaid. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection.

(c) All work under this contract shall be performed in a skillful and workmanlike manner. The Contracting Officer may require, in writing, that the Contractor remove from the work any employee the Contracting Officer deems incompetent, careless, or otherwise objectionable.

**100. \*FAR 52.236-6 SUPERINTENDENCE BY THE CONTRACTOR (APR 1984)**

At all times during performance of this contract and until the work is completed and accepted, the Contractor shall directly superintend the work or assign and have on the work site a competent superintendent who is satisfactory to the Contracting Officer and has authority to act for the Contractor.

**101. FAR 52.236-7 PERMITS AND RESPONSIBILITIES (NOV 1991)**

The Contractor shall, without additional expense to the Government, be responsible for obtaining any necessary licenses and permits, and for complying with any Federal, State, and municipal laws, codes, and regulations applicable to the performance of the work. The Contractor shall also be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.

**102. \*FAR 52.236-8 OTHER CONTRACTS (APR 1984)**

The Government may undertake or award other contracts for additional work at or near the site of the work under this contract. The Contractor shall fully cooperate with the other contractors and with Government employees and shall carefully adapt scheduling and performing the work under this contract to accommodate the additional work, heeding any direction that may be provided by the Contracting Officer. The Contractor shall not commit or permit any act that will interfere with the performance of work by any other contractor or by Government employees.

**103. \*FAR 52.236-9 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS (APR 1984)**

(a) The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this contract. The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.

(b) The Contractor shall protect from damage all existing improvements and utilities

- (1) at or near the work site, and
- (2) on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refused to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

#### **104. FAR 52.236-10 OPERATIONS AND STORAGE AREAS (APR 1984)**

(a) The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the Contracting Officer. The Contractor shall hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.

(b) Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the Government. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.

(c) The Contractor shall, under regulations prescribed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

#### **105. \*FAR 52.236-11 USE AND POSSESSION PRIOR TO COMPLETION (APR 1984)**

(a) The Government shall have the right to take possession of or use any completed or partially completed part of the work. Before taking possession of or using any work, the Contracting Officer shall furnish the Contractor a list of items of work remaining to be performed or corrected on those portions of the work that the Government intends to take possession of or use. However, failure of the Contracting Officer to list any item of work shall not relieve the Contractor of responsibility for complying with the terms of the contract. The Government's possession or use shall not be deemed an acceptance of any work under the contract.

(b) While the Government has such possession or use, the Contractor shall be relieved of the responsibility for the loss of or damage to the work resulting from the Government's possession or use, notwithstanding the terms of the clause in this contract entitled "Permits and Responsibilities." If prior possession or use by the Government delays the progress of the work or causes additional expense to the Contractor, an equitable adjustment shall be made in the contract price or the time of completion, and the contract shall be modified in writing accordingly.

#### **106. \*FAR 52.236-12 CLEANING UP (APR 1984)**

The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. Before completing the work, the Contractor shall remove from the work and premises any rubbish, tools, scaffolding, equipment, and materials that are not the property of the Government. Upon completing the work, the Contractor shall leave the work area in a clean, neat, and orderly condition satisfactory to the Contracting Officer.

**107. \*FAR 52.236-13 ACCIDENT PREVENTION-ALTERNATE I (NOV 1991)**

(a) The Contractor shall provide and maintain work environments and procedures which will (1) safeguard the public and Government personnel, property, materials, supplies, and equipment exposed to Contractor operations and activities; (2) avoid interruptions of Government operations and delays in project completion dates; and (3) control costs in the performance of this contract.

(b) For these purposes on contracts for construction or dismantling, demolition, or removal of improvements, the Contractor shall--

(1) Provide appropriate safety barricades, signs, and signal lights;  
(2) Comply with the standards issued by the Secretary of Labor at 29 CFR Part 1926 and 29 CFR Part 1910; and

(3) Ensure that any additional measures the Contracting Officer determines to be reasonably necessary for the purposes are taken.

(c) If this contract is for construction or dismantling, demolition or removal of improvements with any Department of Defense agency or component, the Contractor shall comply with all pertinent provisions of the latest version of U.S. Army Corps of engineers Safety and Health Requirements Manual, EM 385-1-1, in effect on the date of the solicitation.

(d) Whenever the Contracting Officer becomes aware of any noncompliance with these requirements or any condition which poses a serious or imminent danger to the health or safety of the public or Government personnel, the Contracting Officer shall notify the Contractor orally, with written confirmation, and request immediate initiation of corrective action. This notice, when delivered to the Contractor or the Contractor's representative at the work site, shall be deemed sufficient notice of the noncompliance and that corrective action is required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to promptly take corrective action, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall not be entitled to any equitable adjustment of the contract price or extension of the performance schedule on any stop work order issued under this clause.

(e) The Contractor shall insert this clause, including this paragraph (e), with appropriate changes in the designation of the parties, in subcontractors.

(f) Before commencing the work, the Contractor shall--

(1) Submit a written proposed plan for implementing this clause. The plan shall include an analysis of the significant hazards to life, limb, and property inherent in contract work performance and a plan for controlling these hazards; and

(2) Meet with representatives of the Contracting Officer to discuss and develop a mutual understanding relative to administration of the overall safety program.

**108. \*FAR 52.236-14 AVAILABILITY AND USE OF UTILITY SERVICES (APR 1984)**

(a) The Government shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.

(b) The Contractor, at its expense and in a workmanlike manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to



measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.

**109. FAR 52.236-15 SCHEDULES FOR CONSTRUCTION CONTRACTS (APR 1984)**

(a) The Contractor shall, within five days after the work commences on the contract or another period of time determined by the Contracting Officer, prepare and submit to the Contracting Officer for approval three copies of a practicable schedule showing the order in which the Contractor proposes to perform the work, and the dates on which the Contractor contemplates starting and completing the several salient features of the work (including acquiring materials, plant, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. If the Contractor fails to submit a schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments until the Contractor submits the required schedule.

(b) The Contractor shall enter the actual progress on the chart as directed by the Contracting Officer, and upon doing so shall immediately deliver three copies of the annotated schedule to the Contracting Officer. If, in the opinion of the Contracting Officer, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve its progress, including those that may be required by the Contracting Officer, without additional cost to the Government. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules in chart form as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.

(c) Failure of the Contractor to comply with the requirements of the Contracting Officer under this clause shall be grounds for a determination by the Contracting Officer that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the default terms of this contract.

**110. \*FAR 52.236-17 LAYOUT OF WORK (APR 1984)**

The Contractor shall lay out its work from Government-established base lines and bench marks indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the Contracting Officer. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the Contracting Officer until authorized to remove them. If such marks are destroyed by the Contractor or through its negligence before their removal is authorized, the Contracting Officer may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

**111. FAR 52.236-21 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FEB 1997)**

(a) The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor

without such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information as considered necessary, unless otherwise provided.

(b) Wherever in the specifications or upon the drawings the words "directed," "required," "ordered," "designated," "prescribed," or words of like import are used, it shall be understood that the "direction," "requirement," "order," "designation," or "prescription," of the Contracting Officer is intended and similarly the words "approved," "acceptable," "satisfactory," or words of like import shall mean "approved by," or "acceptable to," or "satisfactory to" the Contracting Officer, unless otherwise expressly stated.

(c) Where "as shown," "as indicated," "as detailed," or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word "provided" as used herein shall be understood to mean "provide complete in place," that is "furnished and installed."

(d) Shop drawings means drawings, submitted to the Government by the Contractor, subcontractor, or any lower tier subcontractor pursuant to a construction contract, showing in detail

(1) the proposed fabrication and assembly of structural elements, and

(2) the installation (i.e., fit, and attachment details) of materials or equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the contract. The Government may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

(e) If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with contract requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate the Government's reasons therefor. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (f) below.

(f) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Contracting Officer approves any such variation, the Contracting Officer shall issue an appropriate contract modification, except that, if the variation is minor or does not involve a change in price or in time of performance, a modification need not be issued.

(g) The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated) of all shop drawings, will be retained by the Contracting Officer and one set will be returned to the Contractor.

## **112. \*FAR 52.236-23 RESPONSIBILITY OF THE ARCHITECT-ENGINEER CONTRACTOR (APR 1984)**

(a) The Contractor shall be responsible for the professional quality, technical accuracy, and the coordination of all designs, drawings, specifications, and other services furnished by the Contractor under this contract. The Contractor shall, without additional compensation, correct or revise any errors or deficiencies in its designs, drawings, specifications, and other services.

(b) Neither the Government's review, approval or acceptance of, nor payment for, the services required under this contract shall be construed to operate as a waiver of any rights under this contract or of any cause of action arising out of the performance of this contract, and the Contractor shall be and remain liable to the Government in accordance with applicable law for all damages to the Government caused by the Contractor's negligent performance of any of the services furnished under this contract.

(c) The rights and remedies of the Government provided for under this contract are in addition to any other rights and remedies provided by law.

(d) If the Contractor is comprised of more than one legal entity, each such entity shall be jointly and severally liable hereunder. (End of clause)

**113. \*FAR 52.236-24 WORK OVERSIGHT IN ARCHITECT-ENGINEER CONTRACTS (APR 1984)**

The extent and character of the work to be done by the Contractor shall be subject to the general oversight, supervision, direction, control, and approval of the Contracting Officer. (End of clause)

**114. \*FAR 52.236-25 REQUIREMENTS FOR REGISTRATION OF DESIGNERS (APR 1984)**

The design of architectural, structural, mechanical, electrical, civil, or other engineering features of the work shall be accomplished or reviewed and approved by architects or engineers registered to practice in the particular professional field involved in a State or possession of the United States, in Puerto Rico, or in the District of Columbia. (End of clause)

**115. \*FAR 52.236-26 PRECONSTRUCTION CONFERENCE (FEB 1995)**

If the Contracting Officer decides to conduct a preconstruction conference, the successful offeror will be notified and will be required to attend. The Contracting Officer's notification will include specific details regarding the date, time, and location of the conference, any need for attendance by subcontractors, and information regarding the items to be discussed.

**116. DFARS 252.236-7000 MODIFICATION OF PROPOSALS - PRICE BREAKDOWN (DEC 1991)**

- (a) The Contractor shall furnish a price breakdown, itemized as required and within the time specified by the Contracting Officer, with any proposal for a contract modification.
- (b) The price breakdown--
  - (1) Must include sufficient detail to permit an analysis of profit, and of all costs for--
    - (i) Material;
    - (ii) Labor,
    - (iii) Equipment;
    - (iv) Subcontracts; and
  - (2) Must cover all work involved in the modification, whether the work was deleted, added, or changed.
- (c) The Contractor shall provide similar price breakdowns to support any amounts claimed for subcontracts.
- (d) The Contractor's proposal shall include a justification for any time extension proposed.

**117. \*FAR 52.242-13 BANKRUPTCY (JUL 1995)**

In the event the Contractor enters into proceedings relating to bankruptcy, whether voluntary or involuntary, the Contractor agrees to furnish, by certified mail or electronic commerce method authorized by the contract, written notification of the bankruptcy to the Contracting Officer responsible for administering the contract. This notification shall be furnished within five days of the initiation of the proceedings relating to bankruptcy filing. This notification shall include the date on which the bankruptcy petition was filed, the identity of the court in which the bankruptcy petition was filed, and a listing of Government contract numbers and contracting offices for all Government contracts against which final payment has not been made. This obligation remains in effect until final payment under this contract.

**118. \*FAR 52.242-14 SUSPENSION OF WORK (APR 1984)**

(a) The Contracting Officer may order the Contractor, in writing, to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Contracting Officer determines appropriate for the convenience of the Government.

(b) If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Contracting Officer in the administration of this contract, or (2) by the Contracting Officer's failure to act within the time specified in this contract (or within a reasonable time if not specified), an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) necessarily caused by the unreasonable suspension, delay, or interruption, and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor, or for which an equitable adjustment is provided for or excluded under any other term or condition of this contract.

(c) A claim under this clause shall not be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order), and (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

**119. DFARS 252.242-7005 COST/SCHEDULE STATUS REPORT (MAR 1998)**

(a) The Contractor shall use management procedures in the performance of this contract that provide for--

- (1) Planning and control of costs;
- (2) Measurement of performance (value for completed tasks); and
- (3) Generation of timely and reliable information for the cost/schedule status report (C/SSR).

(b) As a minimum, these procedures must provide for--

- (1) Establishing the time-phased budgeted cost of work scheduled (including work authorization, budgeting, and scheduling), the budgeted cost for work performed, the actual cost of work performed, the budget at completion, the estimate at completion, and provisions for subcontractor performance measurement and reporting;
- (2) Applying all direct and indirect costs and provisions for use and control of management reserve and undistributed budget;
- (3) Incorporating changes to the contract budget base for both Government directed changes and internal replanning;
- (4) Establishing constraints to preclude subjective adjustment of data to ensure performance measurement remains realistic. The total allocated budget may exceed the contract budget base only after consultation with the Contracting Officer. For cost-reimbursement contracts, the contract budget base shall exclude changes for cost growth increases, other than for authorized changes to the contract scope; and
- (5) Establishing the capability to accurately identify and explain significant cost and schedule variances, both on a cumulative basis and projected at completion basis.

(c) The Offeror/Contractor may use a cost/schedule control system that has been recognized by the cognizant Administrative Contracting Officer (ACO) as complying with the earned value management system criteria provided in DoD 5000.2-R, Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs.

(d) The Government may require integrated baseline reviews. Such reviews shall be scheduled as early as practicable and should be conducted within 180 calendar days after (1) contract award, (2) the exercise of significant contract options, or (3) the incorporation of major modifications. The objective of the integrated baseline review is for the Government and the Contractor to jointly assess areas, such as the Contractor's planning, to ensure complete coverage of the statement of work, logical scheduling of the work activities, adequate resourcing, and identification of inherent risks.

(e) The Contractor shall provide access to all pertinent records, company procedures, and data requested by the Contracting Officer, or authorized representative, to--

- (1) Show proper implementation of the procedures generating the cost schedule information being used to satisfy the C/SSR contractual data requirements to the Government; and
  - (2) Ensure continuing application of the accepted company procedures in satisfying the C/SSR data item.
  - (f) The Contractor shall submit any substantive changes to the procedures and their impact to the ACO for review.
  - (g) The Contractor shall require a subcontractor to furnish C/SSR in each case where the subcontract is other than firm fixed-price, is 12 months or more in duration, and has critical or significant tasks related to the prime contract. Critical or significant tasks shall be defined by mutual agreement between the Government and Contractor. Each subcontractor's reported cost and schedule information shall be incorporated into the Contractor's C/SSR.
- (End of clause)

**120. \*FAR 52.243-1 CHANGES--FIXED-PRICE (AUG 1987) ALTERNATE III (AUG 1984)**

- (a) The Contracting Officer may at any time, by written order, and without notice to the sureties, if any, make changes within the general scope of this contract in the services to be performed.
- (b) If any such change causes an increase or decrease in the cost of, or the time required for, performance of any part of the work under this contract, whether or not changed by the order, the Contracting Officer shall make an equitable adjustment in the contract price, the delivery schedule, or both, and shall modify the contract.
- (c) The Contractor must assert its right to an adjustment under this clause within 30 days from the date of receipt of the written order. However, if the Contracting Officer decides that the facts justify it, the Contracting Officer may receive and act upon a proposal submitted before final payment of the contract.
- (d) If the Contractor's proposal includes the cost of property made obsolete or excess by the change, the Contracting Officer shall have the right to prescribe the manner of the disposition of the property.
- (e) Failure to agree to any adjustment shall be a dispute under the Disputes clause. However, nothing in this clause shall excuse the Contractor from proceeding with the contract as changed.
- (f) No services for which an additional cost or fee will be charged by the Contractor shall be furnished without the prior written authorization of the Contracting Officer. (End of clause)

**121. FAR 52.243-4 CHANGES (AUG 1987)**

- (a) The Contracting Officer may, at any time, without notice to the sureties, if any, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract, including changes--
  - (1) In the specifications (including drawings and designs);
  - (2) In the method or manner of performance of the work;
  - (3) In the Government-furnished facilities, equipment, materials, services, or site; or
  - (4) Directing acceleration in the performance of the work.
- (b) Any other written or oral order (which, as used in this paragraph (b), includes direction, instruction, interpretation, or determination) from the Contracting Officer that causes a change shall be treated as a change order under this clause; provided, that the Contractor gives the Contracting Officer written notice stating
  - (1) the date, circumstances, and source of the order and
  - (2) that the Contractor regards the order as a change order.
- (c) Except as provided in this clause, no order, statement, or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment.
- (d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this contract, whether or not changed by any such order, the Contracting Officer shall make an equitable adjustment and modify the contract in writing. However, except for an adjustment based on defective specifications, no adjustment for any change under paragraph (b) of this clause shall be made for any costs incurred more than 20 days before the Contractor gives written notice as required. In the

case of defective specifications for which the Government is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with the defective specifications.

(e) The Contractor must assert its right to an adjustment under this clause within 30 days after

(1) receipt of a written change order under paragraph (a) of this clause or

(2) the furnishing of a written notice under paragraph (b) of this clause, by submitting to the Contracting Officer a written statement describing the general nature and amount of the proposal, unless this period is extended by the Government. The statement of proposal for adjustment may be included in the notice under paragraph (b) above.

(f) No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.

## **122. DFARS 252.243-7001 PRICING OF CONTRACT MODIFICATIONS (DEC 1991)**

When costs are a factor in any price adjustment under this contract, the contract cost principles and procedures in FAR Part 31 and DRARS Part 231, in effect on the date of this contract, apply.

## **123. DFARS 252.243-7002 REQUESTS FOR EQUITABLE ADJUSTMENT (MAR 1998)**

(a) The amount of any request for equitable adjustment to contract terms shall accurately reflect the contract adjustment for which the Contractor believes the Government is liable. The request shall include only costs for performing the change, and shall not include any costs that already have been reimbursed or that have been separately claimed. All indirect costs included in the request shall be properly allocable to the change in accordance with applicable acquisition regulations.

(b) In accordance with 10 U.S.C. 2410(a), any request for equitable adjustment to contract terms that exceeds the simplified acquisition threshold shall bear, at the time of submission, the following certificate executed by an individual authorized to certify the request on behalf of the Contractor:

I certify that the request is made in good faith, and that the supporting data are accurate and complete to the best of my knowledge and belief.

-----  
(Official's Name)

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(Title)

(c) The certification in paragraph (b) of this clause requires full disclosure of all relevant facts, including--

(1) Cost or pricing data if required in accordance with subsection 15.403-4 of the Federal Acquisition Regulation; and

(2) Information other than cost or pricing data, in accordance with subsection 15.403-3 of the FAR, including actual cost data and data to support any estimated costs, even if cost or pricing data are not required.

(d) The certification requirement in paragraph (b) of this clause does not apply to----

(1) Requests for routine contract payments; for example, requests for payment for accepted supplies and services, routine vouchers under a cost-reimbursement type contract, or progress payment invoices; or

(2) Final adjustment under an incentive provision of the contract.

(End of clause)

**124. \*FAR 52.244-2 SUBCONTRACTS (AUG 1998)**

(a) Definitions. As used in this clause--

"Approved purchasing system" means a Contractor's purchasing system that has been reviewed and approved in accordance with Part 44 of the Federal Acquisition Regulation (FAR).

"Consent of subcontract" means the Contracting Officer's written consent for the Contractor to enter into a particular subcontract.

"Subcontract," means any contract, as defined in FAR Subpart 2.1, entered into by a subcontractor to furnish supplies or services for performance of the the prime contract or a subcontract. It includes, but is not limited to purchase orders, and changes and modifications to purchase orders.

(b) This clause does not apply to subcontracts for special test equipment when the contract contains the clause at FAR 52.245-18, Special Test Equipment.

(c) When this clause is included in a fixed-price type contract, consent to subcontract is required only on unpriced contract actions (including unpriced modification or unpriced delivery orders), and only if required in accordance with paragraph (d) or (e) of this clause.

(d) If the Contractor does not have an approved purchasing system, consent to subcontract is required for any subcontract that--

(1) Is of the cost-reimbursement, time-and-materials, or labor-hour type; or

(2) Is fixed-price and exceeds--

(i) For a contract awarded by the Department of Defense, the Coast Guard, or the National Aeronautics and Space Administration, the greater of the simplified threshold or 5 percent of the total estimated cost of the contract; or

(ii) For a contract awarded by a civilian agency other than the Coast Guard and the National Aeronautics and Space Administration, either the the simplified threshold or 5 percent of the total estimated cost of the contract.

(e) If the Contractor has an approved purchasing system, the Contractor nevertheless shall obtain the Contracting Officer's written consent before placing the following subcontracts:

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(f)(1) The Contractor shall notify the Contracting Officer reasonably in advance of placing any subcontract or modification thereof for which consent is required under paragraph (c), (d), or (e) of this clause, including the following information:

(i) A description of the supplies or services to be subcontracted.

(ii) Identification of the type of subcontract to be used.

(iii) Identification of the proposed subcontractor.

(iv) The proposed subcontract price.

(v) The subcontractor's current, complete, and accurate cost or pricing data and Certificate of Current Cost or Pricing Data, if required by other contract provisions.

(vi) The subcontractor's Disclosure Statement or Certificate relating to Cost Accounting Standards when such data are required by other provisions of this contract.

(vii) A negotiation memorandum reflecting--

- (A) The principal elements of the subcontract price negotiations;
- (B) The most significant considerations controlling establishment of initial or revised prices;
- (C) The reason cost or pricing data were or were not required;
- (D) The extent, if any, to which the Contractor did not rely on the subcontractor's cost or pricing data in determining the price objective and in negotiating the final price;
- (E) The extent to which it was recognized in the negotiation that the subcontractor's cost or pricing data were not accurate, complete, or current; the action taken by the Contractor and subcontractor; and the effect of any such defective data on the total price negotiated;
- (F) The reasons for any significant difference between the Contractor's price objective and the price negotiated; and
- (G) A complete explanation of the incentive fee or profit plan when incentives are used. The explanation shall identify each critical performance element, management decisions used to quantify each incentive element, reasons for the incentives, and a summary of all trade-off possibilities considered.
- (2) The Contractor is not required to notify the Contracting Officer in advance of entering into any subcontract for which consent is not required under paragraph (c), (d), or (e) of this clause.
- (g) Unless the consent or approval specifically provides otherwise, neither consent by the Contracting Officer to any subcontract nor approval of the Contractor's purchasing system shall constitute a determination--
- (1) Of the acceptability of any subcontract terms or conditions;
- (2) Of the acceptability of any cost under this contract; or
- (3) To relieve the Contractor of any responsibility for performing this contract.
- (h) No subcontract or modification thereof placed under this contract shall provide for payment on a cost-plus-a-percentage-of-cost basis, and any fee payable under cost-reimbursement subcontracts shall not exceed the fee limitations in FAR 15.404-4(c)(4)(i).
- (i) The Contractor shall give the Contracting Officer immediate written notice of any action or suit filed and prompt notice of any claim made against the Contractor by any subcontractor or vendor that, in the opinion of the Contractor, may result in litigation related in any way to this contract, with respect to which the Contractor may be entitled to reimbursement by the Government.
- (j) The Government reserves the right to review the Contractor's purchasing system as set forth in FAR Subpart 44.3.
- (k) Paragraphs (d) and (f) of this clause do not apply to the following subcontracts, which ere evaluated during negotiations:

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(End of clause)

**125. \*FAR 52.244-4 SUBCONTRACTORS AND OUTSIDE ASSOCIATES AND CONSULTANTS (ARCHITECT-ENGINEER SERVICES) (AUG 1998)**

Any subcontractors and outside associates or consultants required by the Contractor in connection with the services covered by the contract will be limited to individuals or firms that were specifically identified and agreed to during negotiations. The Contractor shall obtain the Contracting Officer's written consent before making any substitution for these subcontractors, associates, or consultants. (End of clause)

**126. FAR 52.244-6 SUBCONTRACTS FOR COMMERCIAL ITEMS (MAY 2001)**

(a) *Definitions.* As used in this clause—

“Commercial item” has the meaning contained in the clause at 52.202-1, Definitions.



“Subcontract” includes a transfer of commercial items between divisions, subsidiaries, or affiliates of the Contractor or subcontractor at any tier.

(b) To the maximum extent practicable, the Contractor shall incorporate, and require its subcontractors at all tiers to incorporate, commercial items or nondevelopmental items as components of items to be supplied under this contract.

(c)(1) The following clauses shall be flowed down to subcontracts for commercial items:

(i) 52.219-8, Utilization of Small Business Concerns (OCT 2000) (15 U.S.C. 637(d)(2) and (3)), in all subcontracts that offer further subcontracting opportunities. If the subcontract (except subcontracts to small business concerns) exceeds \$500,000 (\$1,000,000 for construction of any public facility), the subcontractor must include 52.219-8 in lower tier subcontracts that offer sub-contracting opportunities.

(ii) 52.222-26, Equal Opportunity (FEB 1999) (E.O. 11246).

(iii) 52.222-35, Affirmative Action for Disabled Veterans and Veterans of the Vietnam Era (APR 1998) (38 U.S.C. 4212(a)).

(iv) 52.222-36, Affirmative Action for Workers with Disabilities (JUN 1998) (29 U.S.C. 793).

(v) 52.247-64, Preference for Privately Owned U.S.-Flagged Commercial Vessels (JUN 2000) (46 U.S.C. Appx 1241) (flowdown not required for subcontracts awarded beginning May 1, 1996).

(2) While not required, the Contractor may flow down to subcontracts for commercial items a minimal number of additional clauses necessary to satisfy its contractual obligations.

(d) The Contractor shall include the terms of this clause, including this paragraph (d), in subcontracts awarded under this contract.

(End of clause)

**127. \*FAR 52.245-2 GOVERNMENT PROPERTY (FIXED-PRICE CONTRACTS) (DEC 1989) [For Government Property over \$100,000]**

(a) Government-furnished property.

(1) The Government shall deliver to the Contractor, for use in connection with and under the terms of this contract, the Government-furnished property described in the Schedule or specifications together with any related data and information that the Contractor may request and is reasonably required for the intended use of the property (hereinafter referred to as "Government-furnished property").

(2) The delivery or performance dates for this contract are based upon the expectation that Government-furnished property suitable for use (except for property furnished "as is") will be delivered to the Contractor at the times stated in the Schedule or, if not so stated, in sufficient time to enable the Contractor to meet the contract's delivery or performance dates.

(3) If Government-furnished property is received by the Contractor in a condition not suitable for the intended use, the Contractor shall, upon receipt of it, notify the Contracting Officer, detailing the facts, and, as directed by the Contracting Officer and at Government expense, either repair, modify, return, or otherwise dispose of the property. After completing the directed action and upon written request of the Contractor, the Contracting Officer shall make an equitable adjustment as provided in paragraph (h) of this clause.

(4) If Government-furnished property is not delivered to the Contractor by the required time, the Contracting Officer shall, upon the Contractor's timely written request, make a determination of the delay, if any, caused the Contractor and shall make an equitable adjustment in accordance with paragraph (h) of this clause.

(b) Changes in Government-furnished property.

(1) The Contracting Officer may, by written notice,

(i) decrease the Government-furnished property provided or to be provided under this contract, or

(ii) substitute other Government-furnished property for the property to be provided by the Government, or to be acquired by the Contractor for the Government, under this contract. The Contractor shall promptly take such action as the Contracting Officer may direct regarding the removal, shipment, or disposal of the property covered by such notice.

(2) Upon the Contractor's written request, the Contracting Officer shall make an equitable adjustment to the contract in accordance with paragraph (h) of this clause, if the Government has agreed in the Schedule to make the property available for performing this contract and there is any--

(i) Decrease or substitution in this property pursuant to subparagraph (b)(1) above;  
or

(ii) Withdrawal of authority to use this property, if provided under any other contract or lease.

(c) Title in Government property. (1) The Government shall retain title to all Government-furnished property.

(2) All Government-furnished property and all property acquired by the Contractor, title to which vests in the Government under this paragraph (collectively referred to as "Government property"), are subject to the provisions of this clause. However, special tooling accountable to this contract is subject to the provisions of the Special Tooling clause and is not subject to the provisions of this clause. Title to Government property shall not be affected by its incorporation into or attachment to any property not owned by the Government, nor shall government property become a fixture or lose its identity as personal property by being attached to any real property.

(3) Title to each item of facilities and special test equipment acquired by the Contractor for the Government under this contract shall pass to and vest in the Government when its use in performing this contract commences or when the Government has paid for it, whichever is earlier, whether or not title previously vested in the Government.

(4) If this contract contains a provision directing the Contractor to purchase material for which the Government will reimburse the Contractor as a direct item of cost under this contract--

(i) Title to material purchased from a vendor shall pass to and vest in the Government upon the vendor's delivery of such material; and

(ii) Title to all other material shall pass to and vest in the Government upon--  
(A) Issuance of the material for use in contract performance;  
(B) Commencement of processing of the material or its use in contract

performance; or

(C) Reimbursement of the cost of the material by the Government, whichever occurs first.

(d) Use of Government property. The Government property shall be used only for performing this contract, unless otherwise provided in this contract or approved by the Contracting Officer.

(e) Property Administration.

(1) The Contractor shall be responsible and accountable for all Government property provided under this contract and shall comply with Federal Acquisition Regulation (FAR) Subpart 45.5, as in effect on the date of this contract.

(2) The Contractor shall establish and maintain a program for the use, maintenance, repair, protection, and preservation of Government property in accordance with sound industrial practice and the applicable provisions of Subpart 45.5 of the FAR.

(3) If damage occurs to Government property, the risk of which has been assumed by the Government under this contract, the Government shall replace the items or the Contractor shall make such repairs as the Government directs. However, if the Contractor cannot effect such repairs within the time required, the Contractor shall dispose of the property as directed by the Contracting Officer. When any property for which the Government is responsible is replaced or repaired, the Contracting Officer shall make an equitable adjustment in accordance with paragraph (h) of this clause.

(4) The Contractor represents that the contract price does not include any amount for repairs or replacement for which the Government is responsible. Repair or replacement of property for which the Contractor is responsible shall be accomplished by the Contractor at its own expense.

(f) Access. The Government and all its designees shall have access at all reasonable times to the premises in which any Government property is located for the purpose of inspecting the Government property.

(g) Risk of loss. Unless otherwise provided in this contract, the Contractor assumes the risk of, and shall be responsible for, any loss or destruction of, or damage to, Government property upon its delivery to the Contractor or upon passage of title to the Government under paragraph (c) of this clause. However, the Contractor

is not responsible for reasonable wear and tear to Government property or for Government property properly consumed in performing this contract.

(h) Equitable adjustment. When this clause specifies an equitable adjustment, it shall be made to any affected contract provision in accordance with the procedures of the Changes clause. When appropriate, the Contracting Officer may initiate an equitable adjustment in favor of the Government. The right to an equitable adjustment shall be the Contractor's exclusive remedy. The Government shall not be liable to suit for breach of contract for--

- (1) Any delay in delivery of Government-furnished property;
- (2) Delivery of Government-furnished property in a condition not suitable for its intended use;
- (3) A decrease in or substitution of Government-furnished property; or
- (4) Failure to repair or replace Government property for which the Government is responsible.

(i) Final accounting and disposition of Government property. Upon completing this contract, or at such earlier dates as may be fixed by the Contracting Officer, the Contractor shall submit, in a form acceptable to the Contracting Officer, inventory schedules covering all items of Government property (including any resulting scrap) not consumed in performing this contract or delivered to the Government. The Contractor shall prepare for shipment, deliver f.o.b. origin, or dispose of the Government property as may be directed or authorized by the Contracting Officer. The net proceeds of any such disposal shall be credited to the contract price or shall be paid to the Government as the Contracting Officer directs.

(j) Abandonment and restoration of Contractor's premises. Unless otherwise provided herein, the Government--

(1) May abandon any Government property in place, at which time all obligations of the Government regarding such abandoned property shall cease; and

(2) Has no obligation to restore or rehabilitate the Contractor's premises under any circumstances (e.g., abandonment, disposition upon completion of need, or upon contract completion). However, if the Government-furnished property (listed in the Schedule or specifications) is withdrawn or is unsuitable for the intended use, or if other Government property is substituted, then the equitable adjustment under paragraph (h) of this clause may properly include restoration or rehabilitation costs.

(k) Communications. All communications under this clause shall be in writing.

(l) Overseas contracts. If this contract is to be performed outside of the United States of America, its territories, or possessions, the words "Government" and "Government-furnished" (wherever they appear in this clause) shall be construed as "United States Government" and "United States Government-furnished," respectively.

**128. \*FAR 52.245-4 GOVERNMENT-FURNISHED PROPERTY (SHORT FORM) (APR 1984)**  
**[For Government Property \$100,000 or Less]**

(a) The Government shall delivery to the Contractor, at the time and locations stated in this contract, the Government-furnished property described in the Schedule or specifications. If that property, suitable for its intended use, is not delivered to the Contractor, the Contracting Officer shall equitably adjust affected provisions of this contract in accordance with the Changed clause when--

- (1) The Contractor submits a timely written request for an equitable adjustment; and
- (2) The facts warrant an equitable adjustment.

(b) Title to Government-furnished property shall remain in the Government. The Contractor shall use the Government-furnished property only in connection with this contract. The Contractor shall maintain adequate property control records in accordance with sound industrial practice and will make such records available for Government inspection at all reasonable times, unless the clause at Federal Acquisition Regulation 52.245-1, Property Records, is included in this contract.

(c) Upon delivery of Government-furnished property to the Contractor, the Contractor assumes the risk and responsibility for its loss or damage, except--

- (1) For reasonable wear and tear;
- (2) To the extent property is consumed in performing this contract; or
- (3) As otherwise provided for by the provisions of this contract.

(d) Upon completing this contract, the Contractor shall follow the instructions of the Contracting Officer regarding the disposition of all Government-furnished property not consumed in performing this contract or

previously delivered to the Government. The Contractor shall prepare for shipment, deliver f.o.b. origin, or dispose of the Government property, as may be directed or authorized by the Contracting Officer. The net proceeds of any such disposal shall be credited to the contract price or shall be paid to the Government as directed by the Contracting Officer.

(e) If this contract is to be performed outside the United States of America, its territories, or possessions, the words "Government" and "Government-furnished" (wherever they appear in this clause) shall be construed as "United States Government" and "United States Government-furnished," respectively.

## **129. \*FAR 52.246-12 INSPECTION OF CONSTRUCTION (AUG 1996)**

(a) Definition. "Work" includes, but is not limited to, materials, workmanship, and manufacture and fabrication of components.

(b) The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work performed under the contract conforms to contract requirements. The Contractor shall maintain complete inspection records and make them available to the Government. All work shall be conducted under the general direction of the Contracting Officer and is subject to Government inspection and test at all places and at all reasonable times before acceptance to ensure strict compliance with the terms of the contract.

(c) Government inspections and tests are for the sole benefit of the Government and do not--

- (1) Relieve the Contractor of responsibility for providing adequate quality control measures;
- (2) Relieve the Contractor of responsibility for damage to or loss of the material before

acceptance;

- (3) Constitute or imply acceptance; or

(4) Affect the continuing rights of the Government after acceptance of the completed work under paragraph (i) below.

(d) The presence or absence of a Government inspector does not relieve the Contractor from any contract requirement, nor is the inspector authorized to change any term or condition of the specification without the Contracting Officer's written authorization.

(e) The Contractor shall promptly furnish, at no increase in contract price, all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by the Contracting Officer. The Government may charge to the Contractor any additional cost of inspection or test when work is not ready at the time specified by the Contractor for inspection or test, or when prior rejection makes reinspection or retest necessary. The Government shall perform all inspections and tests in a manner that will not unnecessarily delay the work. Special, full size, and performance tests shall be performed as described in the contract.

(f) The Contractor shall, without charge, replace or correct work found by the Government not to conform to contract requirements, unless in the public interest the Government consents to accept the work with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises.

(g) If the Contractor does not promptly replace or correct rejected work, the Government may

- (1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor

or

- (2) Terminate for default the Contractor's right to proceed.

(h) If, before acceptance of the entire work, the Government decides to examine already completed work by removing it or tearing it out, the Contractor, on request, shall promptly furnish all necessary facilities, labor, and material. If the work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or its subcontractors, the Contractor shall defray the expenses of the examination and of satisfactory reconstruction. However, if the work is found to meet contract requirements, the Contracting Officer shall make an equitable adjustment for the additional services involved in the examination and reconstruction, including, if completion of the work was thereby delayed, an extension of time.

(i) Unless otherwise specified in the contract, the Government shall accept, as promptly as practicable after completion and inspection, all work required by the contract or that portion of the work the Contracting Officer determines can be accepted separately. Acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the Government's rights under any warranty or guarantee.

**130. \*FAR 52.246-21 WARRANTY OF CONSTRUCTION (MAR 1994)**

(a) In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (i) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier.

(b) This warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.

(c) The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Government-owned or controlled real or personal property, when that damage is the result of--

(1) The Contractor's failure to conform to contract requirements; or

(2) Any defect of equipment, material, workmanship, or design furnished.

(d) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.

(e) The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.

(f) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the Government shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

(g) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall--

(1) Obtain all warranties that would be given in normal commercial practice;

(2) Require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer; and

(3) Enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.

(h) In the event the Contractor's warranty under paragraph (b) of this clause has expired, the Government may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

(i) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.

(j) This warranty shall not limit the Government's rights under the Inspection and Acceptance clause of this contract with respect to latent defects, gross mistakes, or fraud.

**131. DFARS 252.247-7023 TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)**

(a) Definitions.

As used in this clause--

(1) "Components" means articles, materials, and supplies incorporated directly into end products at any level of manufacture, fabrication, or assembly by the Contractor or any subcontractor.

(2) "Department of Defense" (DOD) means the Army, Navy, Air Force, Marine Corps, and defense agencies.

(3) "Foreign flag vessel" means any vessel that is not a U.S.-flag vessel.

(4) "Ocean transportation" means any transportation aboard a ship, vessel, boat, barge, or ferry through international waters.

(5) "Subcontractor" means a supplier, materialman, distributor, or vendor at any level below the prime Contractor whose contractual obligation to perform results from, or is conditioned upon, award of the prime contract and who is performing any part of the work or other requirement of the prime contract.

(6) "Supplies" means all property, except land and interests in land, that is clearly identifiable for eventual use by or owned by the DoD at the time of transportation by sea.

(i) An item is clearly identifiable for eventual use by the DoD if, for example, the contract documentation contains a reference to a DoD contract number or a military destination.

(ii) "Supplies" includes (but is not limited to) public works; buildings and facilities; ships; floating equipment and vessels of every character, type, and description, with parts, subassemblies, accessories, and equipment; machine tools; material; equipment; stores of all kinds; end items; construction materials; and components of the foregoing.

(7) "U.S.-flag vessel" means a vessel of the United States or belonging to the United States, including any vessel registered or having national status under the laws of the United States.

(b) (1) The Contractor shall use U.S. -flag vessels when transporting any supplies by sea under this contract.

(2) A subcontractor transporting supplies by sea under this contract shall use U.S.-flag vessel if--

(i) This Contract is a construction contract; or

(ii) The supplies being transported are--

(A) Noncommercial items; or

(B) Commercial items that--

(1) The Contractor is reselling or distributing to the Government without adding value (generally, the Contractor does not add value to items that it subcontracts for f.o.b. destination shipment);

(2) Are shipped in direct support of U.S. military contingency operations, exercises, or forces deployed in humanitarian or peacekeeping operations; or

(3) Are commissary or exchange cargoes transported outside of the Defense Transportation System in accordance with 10 U.S.C. 2643.

(c) The Contractor and its subcontractors may request that the Contracting Officer authorize shipment in foreign-flag vessels, or designate available U.S.-flag vessels, if the Contractor or a subcontractor believes that--

(1) U.S.-flag vessels are not available for timely shipment;

(2) The freight charges are inordinately excessive or unreasonable; or

(3) Freight charges are higher than charges to private persons for transportation of like goods.

(d) The Contractor must submit any request for use of other than U.S.-flag vessels in writing to the Contracting Officer at least 45 days prior to the sailing date necessary to meet its delivery schedules. The Contracting Officer will process requests submitted after such date(s) as expeditiously as possible, but the Contracting Officer's failure to grant approvals to meet the shipper's sailing date will not of itself constitute a compensable delay under this or any other clause of this contract. Requests shall contain at a minimum--

(1) Type, weight, and cube of cargo;

(2) Required shipping date;

(3) Special handling and discharge requirements;

(4) Loading and discharge points;

(5) Name of shipper and consignee;

(6) Prime contract number, and  
(7) A documented description of efforts made to secure U.S.-flag vessels, including points of contact (with names and telephone numbers) with at least two U.S.-flag carriers contacted. Copies of telephone notes, telegraphic and facsimile message or letters will be sufficient for this purpose.

(e) The Contractor shall, within 30 days after each shipment covered by this clause, provide the Contracting Officer and the Division of National Cargo, Office of Market Development, Maritime Administration, U.S. Department of Transportation, Washington, DC 20590, one copy of the rated on board vessel operating carrier's ocean bill of lading, which shall contain the following information--

- (1) Prime contract number;
- (2) Name of vessel;
- (3) Vessel flag of registry;
- (4) Date of loading;
- (5) Port of loading;
- (6) Port of final discharge;
- (7) Description of commodity;
- (8) Gross weight in pounds and cubic feet if available;
- (9) Total ocean freight in U.S. dollars; and
- (10) Name of the steamship company.

(f) The Contractor agrees to provide with its final invoice under this contract a representation that to the best of its knowledge and belief--

- (1) No ocean transportation was used in the performance of this contract;
- (2) Ocean transportation was used and only U.S.-flag vessels were used for all ocean shipments under the contract;
- (3) Ocean transportation was used, and the Contractor had the written consent of the Contracting Officer for all non-U.S.-flag ocean transportation; or
- (4) Ocean transportation was used and some or all of the shipments were made on non-U.S.-flag vessels without the written consent of the Contracting Officer. The Contractor shall describe these shipments in the following format;

ITEM	CONTRACT
DESCRIPTION	LINE ITEMS QUANTITY

TOTAL

(g) If the final invoice does not include the required representation, the Government will reject and return it to the Contractor as an improper invoice for the purposes of the Prompt Payment clause of this contract. In the event there has been unauthorized use of non-U.S.-flag vessels in the performance of this contract, the Contracting Officer is entitled to equitably adjust the contract, based on the unauthorized use.

(h) The Contractor shall include this clause, including this paragraph (h) in all subcontracts under this contract that-

- (1) Exceed the simplified acquisition threshold in Part 2 of the Federal Acquisition Regulation; and
- (2) Are for a type of supplies described in paragraph (b) (2) of this clause.

**132. DFARS 252.247-7024 NOTIFICATION OF TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)**

(a) The Contractor has indicated by the response to the solicitation provision, Representation of Extent of Transportation by Sea, that it did not anticipate transporting by sea any supplies. If, however, after the award of this contract, the Contractor learns that supplies, as defined in the Transportation of Supplies by Sea clause of this contract, will be transported by sea, the Contractor--

- (1) Shall notify the Contracting Officer of that fact; and
- (2) Hereby agrees to comply with all the terms and conditions of the Transportation of Supplies by Sea clause of this contract.

- (b) (1) The Contractor shall use U.S. -flag vessels when transporting any supplies by sea under this contract.
- (2) A subcontractor transporting supplies by sea under this contract shall use U.S.-flag vessel if--
- (i) This Contract is a construction contract; or
  - (ii) The supplies being transported are--
    - (A) Noncommercial items; or
    - (B) Commercial items that--
      - (1) The Contractor is reselling or distributing to the Government without adding value (generally, the Contractor does not add value to items that it subcontracts for f.o.b. destination shipment);
      - (2) Are shipped in direct support of U.S. military contingency operations, exercises, or forces deployed in humanitarian or peacekeeping operations; or
      - (3) Are commissary or exchange cargoes transported outside of the Defense Transportation System in accordance with 10 U.S.C. 2643.

**133. ~~DELETED FAR 52.248 3~~ ~~VALUE ENGINEERING CONSTRUCTION (FEB 2000)~~  
~~(ALTERNATE I (APR 1984))~~**

~~(a) General. The Contractor is encouraged to develop, prepare, and submit value engineering change proposals (VECP's) voluntarily. The Contractor shall share in any instant contract savings realized from accepted VECP's, in accordance with paragraph (f) of this clause.~~

~~(b) Definitions. "Collateral costs," as used in this clause, means agency costs of operation, maintenance, logistic support, or Government furnished property.~~

~~"Collateral savings," as used in this clause, means those measurable net reductions resulting from a VECP in the agency's overall projected collateral costs, exclusive of acquisition savings, whether or not the acquisition cost changes.~~

~~"Contractor's development and implementation costs," as used in this clause, means those costs the Contractor incurs on a VECP specifically in developing, testing, preparing, and submitting the VECP, as well as those costs the Contractor incurs to make the contractual changes required by Government acceptance of a VECP.~~

~~"Government costs," as used in this clause, means those agency costs that result directly from developing and implementing the VECP, such as any net increases in the cost of testing, operations, maintenance, and logistic support. The term does not include the normal administrative costs of processing the VECP.~~

~~"Instant contract savings," as used in this clause, means the estimated reduction in Contractor cost of performance resulting from acceptance of the VECP, minus allowable Contractor's development and implementation costs, including subcontractors' development and implementation costs (see paragraph (h) of this clause).~~

~~"Value engineering change proposal (VECP)" means a proposal that--~~

- ~~(1) Requires a change to this, the instant contract, to implement; and~~
- ~~(2) Results in reducing the contract price or estimated cost without impairing essential functions or characteristics; provided, that it does not involve a change--
  - ~~(i) In deliverable end item quantities only; or~~
  - ~~(ii) To the contract type only.~~~~

~~(e) VECP preparation. As a minimum, the Contractor shall include in each VECP the information described in paragraphs (c) (1) through (7) of this clause. If the proposed change is affected by contractually required configuration management or similar procedures, the instructions in those procedures relating to format, identification, and priority assignment shall govern VECP preparation. The VECP shall include the following:~~

- ~~(1) A description of the difference between the existing contract requirement and that proposed, the comparative advantages and disadvantages of each, a justification when an item's function or characteristics are being altered, and the effect of the change on the end item's performance.~~
- ~~(2) A list and analysis of the contract requirements that must be changed if the VECP is accepted, including any suggested specification revisions.~~



- (3) ~~— A separate, detailed cost estimate for~~  
(i) ~~— the affected portions of the existing contract requirement and~~  
(ii) ~~— the VECP. The cost reduction associated with the VECP shall take into account the Contractor's allowable development and implementation costs, including any amount attributable to subcontracts under paragraph (h) of this clause.~~
- (4) ~~— A description and estimate of costs the Government may incur in implementing the VECP, such as test and evaluation and operating and support costs.~~
- (5) ~~— A prediction of any effects the proposed change would have on collateral costs to the agency.~~
- (6) ~~— A statement of the time by which a contract modification accepting the VECP must be issued in order to achieve the maximum cost reduction, noting any effect on the contract completion time or delivery schedule.~~
- (7) ~~— Identification of any previous submissions of the VECP, including the dates submitted, the agencies and contract numbers involved, and previous Government actions, if known.~~
- (d) ~~— Submission. The Contractor shall submit VECP's to the Resident Engineer at the worksite, with a copy to the Contracting Officer.~~
- (e) ~~— Government action.~~
- (1) ~~— The Contracting Officer will notify the Contractor of the status of the VECP within 45 calendar days after the contracting office receives it. If additional time is required, the Contracting Officer will notify the Contractor within the 45 day period and provide the reason for the delay and the expected date of the decision. The Government will process VECP's expeditiously; however, it will not be liable for any delay in acting upon a VECP.~~
- (2) ~~— If the VECP is not accepted, the Contracting Officer will notify the Contractor in writing, explaining the reasons for rejection. The Contractor may withdraw any VECP, in whole or in part, at any time before it is accepted by the Government. The Contracting Officer may require that the Contractor provide written notification before undertaking significant expenditures for VECP effort.~~
- (3) ~~— Any VECP may be accepted, in whole or in part, by the Contracting Officer's award of a modification to this contract citing this clause. The Contracting Officer may accept the VECP, even though an agreement on price reduction has not been reached, by issuing the Contractor a notice to proceed with the change. Until a notice to proceed is issued or a contract modification applied a VECP to this contract, the Contractor shall perform in accordance with the existing contract. The decision to accept or reject all or part of any VECP is a unilateral decision made solely at the discretion of the Contracting Officer.~~
- (f) ~~— Sharing.~~
- (1) ~~— Rates. The Government's share of savings is determined by subtracting Government costs from instant contract savings and multiplying the result by~~  
(i) ~~— 45 percent for fixed price contracts or~~  
(ii) ~~— 75 percent for cost reimbursement contracts.~~
- (2) ~~— Payment. Payment of any share due the Contractor for use of a VECP on this contract shall be authorized by a modification to this contract to—~~  
(i) ~~— Accept the VECP;~~  
(ii) ~~— Reduce the contract price or estimated cost by the amount of instant contract savings; and~~  
(iii) ~~— Provide the Contractor's share of savings by adding the amount calculated to the contract price or fee.~~
- (g) ~~— Deleted.~~
- (h) ~~— Subcontracts. The Contractor shall include an appropriate value engineering clause in any subcontract of \$50,000 or more and may include one in subcontracts of lesser value. In computing any adjustment in this contract's price under paragraph (f) of this clause, the Contractor's allowable development and implementation costs clearly resulting from a VECP accepted by the Government under this contract, but shall exclude any value engineering incentive payments to a subcontractor. The Contractor may choose any arrangement for subcontractor value engineering incentive payments; provided, that these payments shall not reduce the Government's share of the savings resulting from the VECP.~~
- (i) ~~— Data. The Contractor may restrict the Government's right to use any part of a VECP or the supporting data by marking the following legend on the affected parts:~~

~~"These data, furnished under the Value Engineering Construction clause of contract \_\_\_\_\_, shall not be disclosed outside the Government or duplicated, used, or disclosed, in whole or in part, for any purpose other than to evaluate a value engineering change proposal submitted under the clause. This restriction does not limit the Government's right to use information contained in these data if it has been obtained or is otherwise available from the Contractor or from another source without limitations."~~

~~If a VECP is accepted, the Contractor hereby grants the Government unlimited rights in the VECP and supporting data, except that, with respect to data qualifying and submitted as limited rights technical data, the Government shall have the rights specified in the contract modification implementing the VECP and shall appropriately mark the data. (The terms "unlimited rights" and "limited rights" are defined in Part 27 of the Federal Acquisition Regulation.)~~

~~\_\_\_\_\_ (End of Clause)~~

**134. \*FAR 52.249-2 TERMINATION FOR CONVENIENCE OF THE GOVERNMENT  
(FIXED-PRICE) ALTERNATE I (SEP 1996) [For Contracts Over \$100,000]**

(a) The Government may terminate performance of work under this contract in whole or, from time to time, in part if the Contracting Officer determines that a termination is in the Government's interest. The Contracting Officer shall terminate by delivering to the Contractor a Notice of Termination specifying the extent of termination and the effective date.

(b) After receipt of a Notice of Termination, and except as directed by the Contracting Officer, the Contractor shall immediately proceed with the following obligations, regardless of any delay in determining or adjusting any amounts due under this clause:

- (1) Stop work as specified in the notice.
- (2) Place no further subcontracts or orders (referred to as subcontracts in this clause) for materials, services, or facilities, except as necessary to complete the continued portion of the contract.
- (3) Terminate all subcontracts to the extent they relate to the work terminated.
- (4) Assign to the Government, as directed by the Contracting Officer, all right, title, and interest of the Contractor under the subcontracts terminated, in which case the Government shall have the right to settle or to pay any termination settlement proposal arising out of those terminations.
- (5) With approval or ratification to the extent required by the Contracting Officer, settle all outstanding liabilities and termination settlement proposals arising from the termination of subcontracts; the approval or ratification will be final for purposes of this clause.
- (6) As directed by the Contracting Officer, transfer title and deliver to the Government
  - (i) the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced or acquired for the work terminated, and
  - (ii) the completed or partially completed plans, drawings, information, and other property that, if the contract had been completed, would be required to be furnished to the Government.
- (7) Complete performance of the work not terminated.
- (8) Take any action that may be necessary, or that the Contracting Officer may direct, for the protection and preservation of the property related to this contract that is in the possession of the Contractor and in which the Government has or may acquire an interest.
- (9) Use its best efforts to sell, as directed or authorized by the Contracting Officer, any property of the types referred to in subparagraph (b) (6) of this clause; provided, however, that the Contractor
  - (i) is not required to extend credit to any purchaser and
  - (ii) may acquire the property under the conditions prescribed by, and at prices approved by, the Contracting Officer. The proceeds of any transfer or disposition will be applied to reduce any payments to be made by the Government under this contract, credited to the price or cost of the work, or paid in any other manner directed by the Contracting Officer.

(c) The Contractor shall submit complete termination inventory schedules no later than 120 days from the effective date of termination, unless extended in writing by the Contracting Officer upon written request of the Contractor within this 120-day period.

(d) After expiration of the plant clearance period as defined in Subpart 45.6 of the Federal Acquisition Regulation, the Contractor may submit to the Contracting Officer a list, certified as to quantity and quality, of termination inventory not previously disposed of, excluding items authorized for disposition by the Contracting Officer. The Contractor may request the Government to remove those items or enter into an agreement for their storage. Within 15 days, the Government will accept title to those items and remove them or enter into a storage agreement. The Contracting Officer may verify the list upon removal of the items, or if stored, within 45 days from submission of the list, and shall correct the list, as necessary, before final settlement.

(e) After termination, the Contractor shall submit a final termination settlement proposal to the Contracting Officer in the form and with the certification prescribed by the Contracting Officer. The Contractor shall submit the proposal promptly, but no later than 1 year from the effective date of termination, unless extended in writing by the Contracting Officer upon written request of the Contractor within this 1 year period. However, if the Contracting Officer determines that the facts justify it, a termination settlement proposal may be received and acted on after 1 year or any extension. If the Contractor fails to submit the proposal within the time allowed, the Contracting Officer may determine, on the basis of information available, the amount, if any, due the Contractor because of the termination and shall pay the amount determined.

(f) Subject to paragraph (e) of this clause, the Contractor and the Contracting Officer may agree upon the whole or any part of the amount to be paid because of the termination. The amount may include a reasonable allowance for profit on work done. However, the agreed amount, whether under this paragraph (f) or paragraph (g) of this clause, exclusive of costs shown in subparagraph (g)(3) of this clause, may not exceed the total contract price as reduced by (1) the amount of payments previously made and (2) the contract price of work not terminated. The contract shall be amended, and the Contractor paid the agreed amount. Paragraph (f) of this clause shall not limit, restrict, or affect the amount that may be agreed upon to be paid under this paragraph.

(g) If the Contractor and the Contracting Officer fail to agree on the whole amount to be paid the Contractor because of the termination of work, the Contracting Officer shall pay the Contractor the amounts determined as follows, but without duplication of any amounts agreed upon under paragraph (f) of this clause:

(1) For contract work performed before the effective date of the termination, the total (without duplication of any items) of--

(i) The cost of this work;

(ii) The cost of settling and paying termination settlement proposals under terminated subcontracts that are properly chargeable to the terminated portion of the contract if not included in subdivision (g)(1)(i) of this clause; and

(iii) A sum, as profit on subdivision (g)(1)(i) of this clause, determined by the Contracting Officer under 49.202 of the Federal Acquisition Regulation, in effect on the date of this contract, to be fair and reasonable; however, if it appears that the Contractor would have sustained a loss on the entire contract had it been completed, the Contracting Officer shall allow no profit under this subdivision (iii) and shall reduce the settlement to reflect the indicated rate of loss.

(2) The reasonable costs of settlement of the work terminated, including--

(i) Accounting, legal, clerical, and other expenses reasonably necessary for the preparation of termination settlement proposals and supporting data;

(ii) The termination and settlement of subcontracts (excluding the amounts of such settlements); and

(iii) Storage, transportation, and other costs incurred, reasonably necessary for the preservation, protection, or disposition of the termination inventory.

(h) Except for normal spoilage, and except to the extent that the Government expressly assumed the risk of loss, the Contracting Officer shall exclude from the amounts payable to the Contractor under paragraph (g) of this clause, the fair value, as determined by the Contracting Officer, of property that is destroyed, lost, stolen, or damaged so as to become undeliverable to the Government or to a buyer.

(i) The cost principles and procedures of Part 31 of the Federal Acquisition Regulation, in effect on the date of this contract, shall govern all costs claimed, agreed to, or determined under this clause.

(j) The Contractor shall have the right of appeal, under the Disputes clause, from any determination made by the Contracting Officer under paragraph (e), (g), or (l) of this clause, except that if the Contractor failed to

submit the termination settlement proposal within the time provided in paragraph (e) or (l), respectively, and failed to request a time extension, there is no right of appeal.

(k) In arriving at the amount due the Contractor under this clause, there shall be deducted--

(1) All unliquidated advance or other payments to the Contractor under the terminated portion of this contract;

(2) Any claim which the Government has against the Contractor under this contract; and

(3) The agreed price for, or the proceeds of sale of, materials, supplies, or other things acquired by the Contractor or sold under the provisions of this clause and not recovered by or credited to the Government.

(l) If the termination is partial, the Contractor may file a proposal with the Contracting Officer for an equitable adjustment of the price(s) of the continued portion of the contract. The Contracting Officer shall make any equitable adjustment agreed upon. Any proposal by the Contractor for an equitable adjustment under this clause shall be requested within 90 days from the effective date of termination unless extended in writing by the Contracting Officer.

(m) (1) The Government may, under the terms and conditions it prescribes, make partial payments and payments against costs incurred by the Contractor for the terminated portion of the contract, if the Contracting Officer believes the total of these payments will not exceed the amount to which the Contractor will be entitled.

(2) If the total payments exceed the amount finally determined to be due, the Contractor shall repay the excess to the Government upon demand, together with interest computed at the rate established by the Secretary of the Treasury under 50 U.S.C. App. 1215(b)(2). Interest shall be computed for the period from the date the excess payment is received by the Contractor to the date the excess is repaid. Interest shall not be charged on any excess payment due to a reduction in the Contractor's termination settlement proposal because of retention or other disposition of termination inventory until 10 days after the date of the retention or disposition, or a later date determined by the Contracting Officer because of the circumstances.

(n) Unless otherwise provided in this contract or by statute, the Contractor shall maintain all records and documents relating to the terminated portion of this contract for 3 years after final settlement. This includes all books and other evidence bearing on the Contractor's costs and expenses under this contract. The Contractor shall make these records and documents available to the Government, at the Contractor's office, at all reasonable times, without any direct charge. If approved by the Contracting Officer, photographs, microphotographs, or other authentic reproductions may be maintained instead of original records and documents.

### **135. \*FAR 52.249-10 DEFAULT (FIXED-PRICE CONSTRUCTION) (APR 1984)**

(a) If the Contractor refuses or fails to prosecute the work or any separable part, with the diligence that will insure its completion within the time specified in this contract including any extension, or fails to complete the work within this time, the Government may, by written notice to the Contractor, terminate the right to proceed with the work (or the separable part of the work) that has been delayed. In this event, the Government may take over the work and complete it by contract or otherwise, and may take possession of and use any materials, appliances, and plant on the work site necessary for completing the work. The Contractor and its sureties shall be liable for any damage to the Government resulting from the Contractor's refusal or failure to complete the work within the specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the Government in completing the work.

(b) The Contractor's right to proceed shall not be terminated nor the Contractor charged with damages under this clause, if-

(1) The delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include

(i) acts of God or of the public enemy,

(ii) acts of the Government in either its sovereign or contractual capacity,

(iii) acts of another Contractor in the performance of a contract with the

Government,

(iv) fires,

(v) floods,

(vi) epidemics,

- (vii) quarantine restrictions,
- (viii) strikes,
- (ix) freight embargoes,
- (x) unusually severe weather, or
- (xi) delays of subcontractors or suppliers at any tier arising from unforeseeable

causes beyond the control and without the fault or negligence of both the Contractor and the subcontractors or suppliers; and

(2) The Contractor, within 10 days from the beginning of any delay (unless extended by the Contracting Officer), notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of delay. If, in the judgment of the Contracting Officer, the findings of fact warrant such action, the time for completing the work shall be extended. The findings of the Contracting Officer shall be final and conclusive on the parties, but subject to appeal under the Disputes clause.

(c) If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been issued for the convenience of the Government.

(d) The rights and remedies of the Government in this clause are in addition to any other rights and remedies provided by law or under this contract.

### **136. ENVIRONMENTAL LITIGATION (1974 NOV OCE)**

(a) If the performance of all or any part of the work is suspended, delayed, or interrupted due to an order of a court of competent jurisdiction as a result of environmental litigation, as defined below, the Contracting Officer, at the request of the Contractor, shall determine whether the order is due in any part to the acts or omissions of the Contractor or a Subcontractor at any tier not required by the terms of this contract. If it is determined that the order is not due in any part to acts or omissions of the Contractor or a Subcontractor at any tier other than as required by the terms of this contract, such suspension, delay, or interruption shall be considered as if ordered by the Contracting Officer in the administration of this contract under the terms of the "Suspension of Work" clause of this contract. The period of such suspension, delay, or interruption shall be considered unreasonable, and an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) as provided in that clause, subject to all the provisions thereof.

(b) The term "environmental litigation," as used herein, means a lawsuit alleging that the work will have an adverse effect on the environment or that the Government has not duly considered, either substantively or procedurally, the effect of the work on the environment.

### **137. EFARS 52.249-5000 BASIS FOR SETTLEMENT OF PROPOSALS**

Actual costs will be used to determine equipment cost for a settlement proposal submitted on the total cost basis under FAR 49.206-2(b). In evaluating a termination settlement proposal using the total cost basis, the following principles will be applied to determine allowable equipment costs:

(1) Actual costs for each piece of equipment, or groups of similar serial or series equipment, need not be available in the contractor's accounting records to determine total actual equipment costs.

(2) If equipment costs have been allocated to a contract using predetermined rates, those charges will be adjusted to actual costs.

(3) Recorded job costs adjusted for unallowable and unallocable expenses will be used to determine equipment operating expenses.

(4) Ownership costs (depreciation) will be determined using the contractor's depreciation schedule (subject to the provisions of FAR 31.205-11).

(5) License, taxes, storage and insurance costs are normally recovered as an indirect expense and unless the contractor charges these costs directly to contracts, they will be recovered through the indirect expense rate.

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SECTION 00800

SPECIAL CONTRACT REQUIREMENTS  
**5/00, Rev 9/01**

PART 1 GENERAL

Attachments:

General Wage Decision Nos. CO010001 (Heavy/Highway) and CO010002  
(Building)

1.1 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984)

The Contractor shall be required to (a) commence work under this contract within ten (10) calendar days after the date of receipt by him of Notice to Proceed, (b) prosecute said work diligently, and (c) complete the entire work ready for use not later than 440 calendar days after notice to proceed NTP. The 440 calendar days indicated on Standard Form SF 1442 (Page 00010-1) include design, design reviews and all construction activities. The time stated for completion of the project shall include final cleanup of the premises. (FAR 52.211-10)

1.1.1 Sequence of Design-Construction

(a) After receipt of the Contract Notice to Proceed (NTP), the Contractor shall initiate design, comply with all design submission requirements as covered in Division 01 General Requirements of the advertised Solicitation, and obtain Government review of each submission. No construction may be started until the Government reviews the 100 Percent Corrected Design submission and determines it satisfactory for purposes of beginning construction. The Contractor has the option to submit the design as an entirely complete design package (design analysis, plans and specifications) or as two (2) separate complete design packages (design analysis, plans and specifications), one for the site work and utilities and one for all other work. Each package will require the same design submittals, design reviews and design review conferences as set forth in the Contract. The Government will not grant any time extension for any design resubmittal required when, in the opinion of the Contracting Officer, the initial submission failed to meet the minimum quality requirements as set forth in the Contract.

(b) If the Government allows the Contractor to proceed with limited construction based on pending minor revisions to the reviewed 100 Percent Corrected Design submission, no payment will be made for any in-place construction related to the pending revisions until they are completed, resubmitted and are satisfactory to the Government.

1.2 LIQUIDATED DAMAGES-CONSTRUCTION (SEPT 2000)

(a) If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of \$2000.00 for each calendar day of delay until the work is completed or accepted.

(b) If the Government terminates the Contractor's right to proceed,

liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause. (FAR 52.211-12)

### 1.3 EXCEPTION TO COMPLETION TIME AND LIQUIDATED DAMAGES

In case the Contracting Officer determines that seeding, sodding, and/or planting and/or the specified maintenance thereof is not feasible during the construction period, such work will be excepted from the completion time and liquidated damages. This work shall be accomplished during the first seeding, sodding, and/or planting period and the specified maintenance period following the completion date.

### 1.4 NOT USED

### 1.5 DESIGN-BUILD CONTRACT - ORDER OF PRECEDENCE

(a) The contract includes the standard contract clauses and schedules current at the time of contract award. It entails (1) the solicitation in its entirety, including all drawings, cuts, and illustrations, and any amendments, and (2) the successful offeror's accepted proposal. The contract constitutes and defines the entire agreement between the Contractor and the Government. No documentation shall be omitted which in any way bears upon the terms of that agreement.

(b) In the event of conflict or inconsistency between any of the provisions of this contract, precedence shall be given in the following order:

(1) Betterments: Any portion of the accepted proposal, which both conform to and exceed the provisions of the solicitation. "Betterment" is defined as any product, component, or system, which exceeds the requirements stated in the solicitation.

(2) The provisions of the solicitation. (See also Contract Clause entitled "SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION".)

(3) All other provisions of the accepted proposal.

(4) Any design products including, but not limited to, plans, specifications, engineering studies and analyses, shop drawings, equipment installation drawings, etc.. These are "deliverable" under the contract and are not part of the contract itself. Design products must conform with all the provisions of the contract, in the order of precedence herein.

(c) Where conflicts between the solicitation requirements and the UFGS guide specifications (available through the UFGS website listed in Section 01332 Submittals During Design or made available from the Omaha District) exist, the solicitation requirements shall take precedence. Any installation requirements within solicitation requirements, but not contained in the UFGS guide specifications, shall be added to the specifications or shown on the drawings.

### 1.6 RESPONSIBILITY OF THE CONTRACTOR FOR DESIGN

(a) The Contractor shall be responsible for the professional quality, technical accuracy, and the coordination of all designs, drawings,

specifications, and any other non-construction services furnished by the Contractor under this contract. The Contractor shall, without additional compensation, correct or revise any errors or deficiency in its designs, drawings, specifications, and other non-construction services.

(b) Neither the Government's review, approval or acceptance of, nor payment for, the services required under this contract shall be construed to operate as a waiver of any rights under this contract or any cause of action arising out of the performance of this contract, and the Contractor shall be and remain liable to the Government in accordance with applicable law for all damages to the Government caused by the Contractor's negligent performance of any of the services described in paragraph (a) furnished under this contract.

(c) The rights and remedies of the Government provided under this contract are in addition to any other rights and remedies provided by law.

## 1.7 SECURITY REQUIREMENTS

### 1.7.1 USAFA Entry

The Contractor shall provide the Contracting Officer an entrance authorization list of employees that will require access to the construction site on U.S. Air Force Academy, Colorado. This list shall include full employee name (as it would appear on a driver's license), company and last 6 digits of social security number. The Contractor shall update this list anytime the names on the list change. Contractor employees are required to have a picture Identification and last 6 digits of social security number for entry onto the U.S. Air Force Academy, Colorado. The Contractor shall anticipate 1/2 hour entry delays for both delivery of materials and for personnel access to the installation. Both vehicles and personnel shall be subject to search.

### 1.7.2 Contractor's Employee Identification

The Contractor shall be responsible for furnishing to each employee and for requiring each employee engaged on the work to display such identification as may be approved and directed by the Contracting Officer. All prescribed identification shall immediately be delivered to the Contracting Officer, for cancellation upon release of any employees. When the contract involves work in restricted security areas, only employees who are U.S. citizens will be permitted to enter. Proof of U.S. citizenship is required prior to entry. When required by the Contracting Officer, the Contractor shall obtain and submit fingerprints of all persons employed or to be employed on the project. (Based on FAR 52.204-2)

## 1.8 MISSION DELAY DAYS

The Contractor shall anticipate a work delay of up to seven (7) days during the contract period due to Using Service operations. The Contractor will be notified one week in advance of these interruptions. This time is included in the overall completion time stated.

## 1.9 CONTRACT DRAWINGS AND SPECIFICATIONS

### 1.9.1 SETS FURNISHED

Within thirty (30) days after award of the contract, the Government will furnish the Contractor a CD-ROM containing the RFP drawings in an AutoCAD format, RFP technical criteria requirements/specifications in a Specsintact format and other miscellaneous items (amendments and attachments). For additional information, See Section 01332, SUBMITTAL DURING DESIGN.

#### 1.10 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330SUBMITTAL PROCEDURES:

##### SD-02 Shop Drawings

Equipment Room Drawings; G-RE.

This submittal is not required during construction, if equipment room drawings are shown on the 100 percent design submittal.

#### 1.11 PHYSICAL DATA (APR 1984)

Data and information furnished or referred to below is for the Contractors' information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

a. The indications of physical conditions on the drawings and in the specifications are the result of site investigations by surveys and borings. The data shown graphically and by symbol for each respective boring represents the actual geologic features observed and logged at the location given on the drawings. While the borings are representative of subsurface conditions at their respective locations and for their respective vertical reaches, local minor variations characteristic of the subsurface materials of this region could occur.

b. Weather conditions shall have been investigated by the Contractor to satisfy himself as to the hazards likely to arise therefrom. Complete weather records and reports may be obtained from the local U.S. Weather Bureau.

c. Transportation facilities shall have been investigated by the Contractor to satisfy himself as to the existence of access highways and railroad facilities. (FAR 52.236-4)

#### 1.12 CONCURRENT CONSTRUCTION

Concurrent construction work under current contract, including Upgrade of Water Distribution System and Upgrade Athletic Project will be in progress simultaneously with work under this contract at the Academy. The Contractor shall cooperate with others as necessary in the interest of timely completion of all work. In the event of interference, the Contracting Officer shall be notified immediately for resolution and his decision shall be final.

#### 1.13 PAYMENT

1.13.1 PROMPT PAYMENT ACT

Pay requests authorized in CONTRACT CLAUSES clause: "Payments Under Fixed-Price Construction Contracts", will be paid pursuant to the clause, "Prompt Payment for Construction Contracts". Pay requests will be submitted on ENG Form 93 and 93a, "Payment Estimate-Contract Performance" and "Continuation". All information and substantiation required by the identified contract clauses will be submitted with the ENG Form 93, and the required certification will be included on the last page of the ENG Form 93a, signed by an authorized contractor official and dated when signed. The designated billing office is the Office of the Area Engineer.

1.13.2 PAYMENTS FOR MODIFICATIONS

Payments may be made for cost bearing change orders within the scope of the contract only to the extent funds are authorized in the order on a two-part modification. Contractor pricing proposed must be submitted at the earliest possible time after the change order is issued, or at a specific time as directed by the Contracting Officer. At the discretion of the Contracting Officer, any and all payments may be withheld on the modification until the Contractor has submitted a qualifying price proposal, in as much detail as required by the Contracting Officer, and the final price has been agreed.

1.13.3 PAYMENT FOR MATERIALS DELIVERED OFFSITE (MAR 1995)

a. Pursuant to FAR clause 52.232-5, Payments Under Fixed Priced Construction Contracts, materials delivered to the contractor at locations other than the site of the work may be taken into consideration in making payments if included in payment estimates and if all the conditions of the General Provisions are fulfilled. Payment for items delivered to locations other than the work site will be limited to: (1) materials required by the technical provisions; or (2) materials that have been fabricated to the point where they are identifiable to an item of work required under this contract.

b. Such payment will be made only after receipt of paid or receipted invoices or invoices with canceled check showing title to the items in the prime contractor and including the value of material and labor incorporated into the item. Payment for materials delivered off-site includes petroleum products. (List additional items for which payments will be made for off-site delivery.) (EFAR 52.232-5000)

1.14 AVAILABILITY OF UTILITY SERVICES

All reasonably required amounts of domestic water and electricity will be made available to the Contractor by the Government from existing system outlets and supplies at no cost. The Contractor shall, at his own expense, make all temporary connections and install distribution lines. The Contractor shall furnish to the Contracting Officer a complete system layout drawing showing type of materials to be used and method of installation for all temporary electrical systems. . All temporary lines shall be maintained by the Contractor in a workmanlike manner satisfactory to the Contracting Officer and shall be removed by the Contractor in like manner prior to final acceptance of the construction. Normal quantities of electricity and water used to make final tests of completely installed systems will be furnished by the Government.

1.15 UTILITY SERVICE INTERRUPTIONS

The Contractor shall submit written notification not less than 15 calendar days in advance of each interruption of each utility and communication service to or within existing buildings and facilities being used by others. No single outage will exceed 4 hours unless approved in writing. The time and duration of all outages will be coordinated and approved with the Using Agency by the Contracting Officer.

1.16 DIGGING PERMITS AND ROAD CLOSINGS

The Contractor shall allow 14 calendar days from date of written application to receive permission to dig and to close roads. Roads shall only be closed one lane at a time and vehicular traffic shall be allowed to pass through the construction area. Work on or near roadways shall be flagged in accordance with the safety requirements in Safety and Health Requirements Manual EM 385-1-1, which forms a part of these specifications.

Work located along the alert force route shall not cause blockage and the Contractor shall maintain unobstructed access for alert force traffic at all times.

1.17 NOT USED

1.18 NOT USED

1.19 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

a. This clause specifies the procedure for the determination of time extensions for unusually severe weather in accordance with the contract clause entitled "Default: (Fixed-Price Construction)." In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

(1) The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

(2) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the contractor.

b. The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY  
WORK DAYS BASED ON (5) DAY WORK WEEK

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
(08)	(05)	(04)	(04)	(06)	(04)	(07)	(05)	(03)	(02)	(03)	(06)

c. Upon acknowledgment of the Notice to Proceed (NTP) and continuing throughout the contract, the contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the contractor's scheduled work day. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph b. above, the contracting officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the contract clause entitled "Default (Fixed Price Construction)". (ER 415-1-15)

#### 1.20 INSURANCE REQUIRED

In accordance with CONTRACT CLAUSES clause: "Insurance Work on a Government Installation," the Contractor shall procure the following minimum insurance:

Type	Amount
Workmen's Compensation and Employer's Liability Insurance	\$100,000
General Liability Insurance	\$500,000 per occurrence
Automobile Liability Insurance	
Bodily injury	\$200,000 per person and \$500,000 per occurrence
Property damage	\$ 20,000 per occurrence

(Coverages per FAR 28.307-2)

#### 1.21 SECURITY REQUIREMENTS

#### 1.22 CONTRACTOR QUALITY CONTROL (CQC)

See Section 01451 Contractor Quality Control.

#### 1.23 NONDOMESTIC CONSTRUCTION MATERIALS

The List of nondomestic construction materials or their components included in the list set forth in paragraph 25.104 of the Federal Acquisition Regulation does not apply to the requirements of the contract clause entitled "Buy American Act Construction Materials".

#### 1.24 NOTICE OF PRIORITY RATING FOR NATIONAL DEFENSE USE (SEP 1990)

Any contract awarded as a result of this solicitation will be a DO rated order certified for national defense use under the Defense Priorities and Allocations System (DPAS) (15 CFR 700), and the Contractor will be required to follow all of the requirements of this regulation. (FAR 52.211-14)

#### 1.25 DAILY WORK SCHEDULES

In order to closely coordinate work under this contract, the Contractor

shall prepare a written agenda/meeting minutes and attend a weekly coordination meeting with the Contracting Officer and Using Service at which time the Contractor shall submit for coordination and approval, his proposed daily work schedule for the next two week period. The Contractor shall provide a copy of modifications (MODs), Serial Letters, Requests for Information (RFIs) and any other information that is needed in the minutes of the meeting. Required temporary utility services, time and duration of interruptions, and protection of adjoining areas shall be included with the Contractor's proposed 2-week work schedule. At this meeting, the Contractor shall also submit his schedule of proposed dates and times of all preparatory inspections to be performed during the next 2 weeks. The items of work listed on the proposed 2-week schedule are to be keyed to the NAS by activity number and description for each activity anticipated to be performed during the next 2-week period. Coordination action by the Contracting Officer relative to these schedules will be accomplished during these weekly meetings. Daily reports shall be completed and given to the Contracting Officer or Representative within 24 hours of work. The Contractor shall keep written minutes of these meetings and shall distribute copies to all attendees within three days of these meetings.

1.26 EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (MAR 1995)

a. This statement shall become operative only for negotiated contracts where cost or pricing data is requested, and for modifications to sealed bid or negotiated contracts where cost or pricing data is requested. This clause does not apply to terminations. See 52.249-5000, Basis for settlement of proposals and FAR Part 49.

b. Allowable cost for construction and marine plant and equipment in sound workable condition owned or controlled and furnished by a Contractor or subcontractor at any tier shall be based on actual cost data for each piece of equipment or groups of similar serial and series for which the Government can determine both ownership and operating costs from the Contractor's accounting records. When both ownership and operating costs cannot be determined for any piece of equipment or groups of similar serial or series of equipment from the Contractor's accounting records, costs for that equipment shall be based upon the applicable provisions of EP 1110-1-8, "Construction Equipment Ownership and Operating Expense

Schedule," Region V. Copies of each regional schedule may be obtained through the following internet site:  
<http://www.usace.army.mil/inet/usace-docs/eng-pamphlets/ep.htm> or on the CD-ROM issued for this solicitation. Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the Contracting Officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be developed using the formula provided in the schedule. For forward pricing, the Schedule in effect at the time of negotiations shall apply. For retrospective pricing, the Schedule in effect at the time the work was performed shall apply.

c. Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36. Rates for equipment rented from an organization under common control, lease-purchase arrangements, and sale-leaseback arrangements will be determined using the schedule, except that actual rates will be used for equipment leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees.



c. When actual equipment costs are proposed and the total amount of the pricing action exceeds the small purchase threshold, the contracting officer shall request the contractor to submit either certified cost or pricing data, or partial/limited data as appropriate. The data shall be submitted on Standard Form 1411, Contract Pricing Proposal Cover Sheet. (EFARS 52.231-5000)

1.27 AS-BUILT DRAWINGS

See SECTION 01040 - AS-BUILT DRAWINGS

1.28 SIGN

On commencement of work on this project, the Contractor shall furnish and erect the temporary sign in the location selected by the Contracting Officer near the project site. The Contractor shall maintain the sign in good condition through the project construction period. Upon completion of the project the Contractor shall remove the sign from the premises. The project sign shall conform to the USAFA project sign standards. A decal of the "Engineer Castle" and USAFA emblem will be furnished to the Contractor upon request.

1.29 NOT USED

1.30 EQUIPMENT ROOM DRAWINGS

Prior to construction, the Contractor shall prepare and submit room plans (see paragraph SUBMITTALS for conditions regarding this submittal under Design/Build procurement) for all mechanical, electrical, and communication rooms or similar areas. The plans shall be consolidated for all trades, shall be to scale, and shall show all pertinent structural features. All equipment shall be accessible and laid out in a good design and workmanship manner and layouts for communications rooms shall be completed as early as possible. In addition, other items such as doors, windows, and cabinets required for installation and which will affect the available space, will be shown. All mechanical and electrical equipment and accessories shall be shown to scale in plan and elevation and/or section in their installed positions. All duct work and piping shall be shown.

1.31 CONTRACTOR FURNISHED EQUIPMENT DATA

See Section 01200 Warranty of Construction for Contractor Furnished Equipment Data to be submitted as part of the Warranty Equipment Booklet.

1.32 ACCOMMODATIONS FOR GOVERNMENT INSPECTORS

The Contractor shall furnish a temporary office facility approximately 10 feet x 20 feet with a minimum of 200 square feet of floor space. It shall be located where directed and shall be reserved for Government personnel only. Drinking water facilities, adequate lighting, local commercial telephone service, air-conditioning, heating equipment, and a partition enclosed chemical toilet shall be furnished and maintained by the Contractor. The office shall be furnished with one legal size filing cabinet with four drawers, one drafting table with stool, one plan rack, one desk, and three chairs. Used furniture, in good condition, will be acceptable. Entrance doors shall be equipped with a substantial lock. The Contractor shall provide janitor service, fuel for the heating facilities,

electricity, telephone and water, all at no cost to the Government, except the Contractor will not be liable for Government long-distance calls. The entire facility, including furniture, will remain the property of the Contractor and shall be removed from the site after completion of the work.

1.33 NOT USED

1.34 NOT USED

1.35 NOT USED

1.36 PERFORMANCE OF WORK BY CONTRACTOR (APR 1984)

The Contractor shall perform on the site, and with its own organization, work equivalent to at least twenty (20) percent of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government. (FAR 52.236-1)

1.37 NOT USED

1.38 PARTNERING

a. The Government intends to encourage the formation of a cohesive partnership with the Contractor. This partnership will be structured to draw on the strengths of each organization to identify and achieve reciprocal goals. The objective is effective contract performance in achieving completion within budget, on schedule and in accordance with plans and specifications. This partnership between the Contractor and the Government will be voluntary and its implementation will not be part of the contract requirements nor will it result in a change to contract price or terms.

b. It is anticipated that immediately after the preconstruction conference, the appropriate Contractor's key personnel and Government key personnel will attend a 2-day team building workshop. Follow-up workshops of 1 or 2 days duration may be held periodically throughout the duration of the contract as agreed to by the Contractor and the Government. Costs of the facilitator and facilities for the workshops will be shared equally by the participants.

1.39 PROFIT

a. Weighted guidelines method of determining profit shall be used on any equitable adjustment change order or modification issued under this contract. The profit factors shall be as follows:

Factor	Rate	Weight	Value
Degree of Risk	20		

Relative difficulty of work	15
Size of Job	15
Period of performance	15
Contractor's investment	5
Assistance by Government	5
Subcontracting	25
	100

b. Based on the circumstances of each procurement action, each of the above factors shall be weighted from .03 to .12 as indicated below. The value shall be obtained by multiplying the rate by the weight. The value column when totalled indicates the fair and reasonable profit percentage under the circumstances of the particular procurement.

(1) Degree of Risk. Where the work involves no risk or the degree of risk is very small, the weighting should be .03; as the degree of risk increases, the weighting should be increased up to a maximum of .12. Lump sum items will have, generally, a higher weighted value than the unit price items for which quantities are provided. Other things to consider: the portion of the work to be done by subcontractors, nature of work, where work is to be performed, reasonableness of negotiated costs, amount of labor included in costs, and whether the negotiation is before or after performance of work.

(2) Relative Difficulty of Work. If the work is most difficult and complex, the weighting should be .12 and should be proportionately reduced to .03 on the simplest of jobs. This factor is tied in to some extent with the degree of risk. Some things to consider: the nature of the work, by whom it is to be done, where, and what is the time schedule.

(3) Size of Job. All work not in excess of \$100,000 shall be weighted at .12. Work estimated between \$100,000 and \$5,000,000 shall be proportionately weighted from .12 to .05.

(4) Periods of Performance. Jobs in excess of 24 months are to be weighted at .12. Jobs of lesser duration are to be proportionately weighted to a minimum of .03 for jobs not to exceed 30 days. No weight where additional time not required.

(5) Contractor's Investment. To be weighted from .03 to .12 on the basis of below average, average, and above average. Things to consider: amount of subcontracting, mobilization payment item, Government furnished property, equipment and facilities, and expediting assistance.

(6) Assistance by Government. To be weighted from .12 to .03 on the basis of average to above average. Things to consider: use of Government-owned property, equipment and facilities, and expediting assistance.

(7) Subcontracting. To be weighted inversely proportional to the amount of subcontracting. Where 80 percent or more of the work is to be subcontracted, the weighting is to be .03 and such weighting

proportionately increased to .12 where all the work is performed by the Contractor's own forces.

1.40 NOT USED

1.41 NOT USED

1.42 LABOR CONDITIONS APPLICABLE TO TEMPORARY FACILITIES

It is the position of the Department of Defense that the Davis-Bacon Act, 40 U.S.C. 276a is applicable to temporary facilities such as batch plants, sandpits, rock quarries, and similar operations, located off the immediate site of the construction but set up exclusively to furnish required materials for a construction project on the site of the work. Clause "Payrolls and Basic Records" of the CONTRACT CLAUSES is applicable to such operations.

1.43 DRAWING SCALES

All scales shown on the RFP project drawings are based on a standard drawing size of metric drawing size of 841mm x 594mm. If any other size drawings are furnished or plotted, the contractor shall adjust the scales accordingly. The Contractor shall also advise his sub-contractors of the above.

1.44 WAGE RATE APPLICATION

1.44.1 Building Schedule

Applicable to all work required within 5 feet outside the building lines.

1.44.2 Heavy and Highway Schedule

Applicable to all work required beyond 5 feet outside the building.

1.45 (FAR 52.222-23) NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY FOR CONSTRUCTION (FEB 1999)

(a) The offeror's attention is called to the Equal Opportunity clause and the Affirmative Action Compliance Requirements for Construction clause of this solicitation.

(b) The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals for Minority Participation  
for Each Trade

\*\*\*\*\*

Goals for Female Participation  
for Each Trade

\*\*\*\*\*

10.9

6.9

These goals are applicable to all the Contractor's construction work performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, the Contractor shall apply the goals established for the geographical area where the work is actually performed. Goals are published periodically in the Federal Register in notice form, and these notices may be obtained from any Office of Federal Contract Compliance Programs Office.

(c) The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on (1) its implementation of the Equal Opportunity clause, (2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction," and (3) its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

(d) The Contractor shall provide written notification to the Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, within 10 working days following award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the -

- (1) Name, address, and telephone number of the subcontractor;
- (2) Employer identification number of the subcontractor;
- (3) Estimated dollar amount of the subcontract;
- (4) Estimated starting and completion dates of the subcontract; and
- (5) Geographical area in which the subcontract is to be performed.

(e) As used in this Notice, and in any contract resulting from this solicitation, the "covered area" is Colorado Springs SMSA-1720, which El Paso county is a part of.

#### 1.46 FEDERAL HOLIDAYS

The following Federal legal holidays are observed by this installation:

New Year's Day	1 January
Martin Luther King's Birthday	Third Monday in January
President's Day	Third Monday in February
Memorial Day	Last Monday in May
Independence Day	4 July
Labor Day	First Monday in September
Columbus Day	Second Monday in October
Veterans Day	11 November
Thanksgiving Day	Fourth Thursday in November
Christmas Day	25 December

If a wage determination applies the number of holidays specified on it, it has priority over this clause.

1.47 SPECIAL USAF ACADEMY REQUIREMENTS

- a. All earth, concrete rubble, broken asphalt, metal, etc., shall be properly disposed of off Government lands at the Contractor's expense.
- b. A construction storage and staging area, as shown on the drawings, will be made available to the Contractor near the site.
- c. The Contractor's work areas and personnel will be restricted to designated construction areas.
- d. All Contractor-owned or Company-owned vehicles brought onto Government land by the Contractor shall have the company name displayed on the vehicle.
- e. The Contractor's work hours shall be between 7:00 a.m. and 5:00 p.m., Monday through Friday, unless other hours are required and approved by the Contracting Officer.
- f. All buildings and parking areas in the adjacent areas will be operational during the construction period.
- g. The Contractor shall obtain a digging permit at no cost from the Using Service through the Contracting Officer before any digging operations commence.
- h. Not Used.
- i. Not Used.
- j. The Contractor shall keep the fire lanes open for access around adjacent buildings and parking areas.
- k. Not Used.
- l. If VIP visit, parades, etc. are scheduled, the Contractor shall minimize outdoor activity and clean-up the construction site. The Contracting Officer will provide a 48 hour notice of these activities to the Contractor.
- m. No work will be allowed at the construction site during the last week in May of any year due to Air Force Academy event days (graduation). No time extensions will be granted for delays during this period.

PART 2 NOT USED

PART 3 NOT USED

-- End of Section --

CONTROL TOWER, USAFA, CO  
02/16/02

AA20

-- End of Section --

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GENERAL DECISION CO010001 12/28/01 CO1  
General Decision Number CO010001

Superseded General Decision No. CO000001

State: Colorado

Construction Type:  
HEAVY  
HIGHWAY

County(ies):  
STATEWIDE

HEAVY AND HIGHWAY CONSTRUCTION PROJECTS

Modification Number	Publication Date
0	03/02/2001
1	03/09/2001
2	05/04/2001
3	07/06/2001
4	07/20/2001
5	08/10/2001
6	10/05/2001
7	10/12/2001
8	10/19/2001
9	10/26/2001
10	11/09/2001
11	12/28/2001

COUNTY(ies):  
STATEWIDE

CARP0002E 05/01/2001		
	Rates	Fringes
CARPENTERS	19.77	5.40

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CARP2834A 05/01/2001		
	Rates	Fringes
MILLWRIGHTS	22.22	5.84

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ELEC0012B 06/01/2000		
	Rates	Fringes
ALAMOSA, ARCHULETA, BACA, BENT, CHAFFEE, CONEJOS, COSTILLA, CROWLEY, CUSTER, FREMONT, HUERFANO, KIOWA, LAS ANIMAS, MINERAL, OTERO, PROWERS, PUEBLO, RIO GRANDE AND SAGUACHE COUNTIES		

ELECTRICIANS:		
Electrical work \$200,000 or less	18.98	3%+6.14
Electrical work over \$200,000	22.13	3%+6.14

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ELEC0068A 06/01/2001		
	Rates	Fringes
ADAMS, ARAPAHOE, BOULDER, CLEAR CREEK, DENVER, DOUGLAS, EAGLE, GILPIN, GRAND, JACKSON, JEFFERSON, LAKE, LARIMER, LOGAN, MORGAN, PHILLIPS, SEDGWICK, SUMMIT, WASHINGTON, WELD AND YUMA COUNTIES		
ELECTRICIANS	25.76	3%+7.21

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ELEC0111A 09/01/2001		
	Rates	Fringes
LINE CONSTRUCTION:		
Cable Splicers	26.06	19.75%+2.20
Lineman, Gas Fitter/Welder	26.56	19.75%+2.20
Line Equipment Operator,		
Line Truck Crew	20.73	19.75%+2.20
Groundman	13.64	19.75%+2.20

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ELEC0111B 03/01/1998		
	Rates	Fringes
TRAFFIC SIGNAL INSTALLER	18.56	10.6%+ 2.00
EQUIPMENT OPERATOR	17.48	10.6%+ 2.00
GROUNDMAN	11.52	10.6%+ 2.00

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ELEC0113C 06/01/2001		
	Rates	Fringes
CHEYENNE, ELBERT, EL PASO, KIT CARSON, LINCOLN, PARK, AND TELLER COUNTIES		

ELECTRICIANS	23.35	3%+8.14
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ELEC0969C 06/01/2000

	Rates	Fringes
DELTA, DOLORES, GARFIELD, GUNNISON, HINSDALE, LA PLATA, MESA, MOFFAT, MONTEZUMA, MONTROSE, OURAY, PITKIN, RIO BLANCO, ROUTT, SAN JUAN AND SAN MIGUEL COUNTIES		

ELECTRICIANS	20.35	4%+5.14
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\* ENGI0009A 04/23/2001

	Rates	Fringes
POWER EQUIPMENT OPERATORS: (TUNNELS ABOVE AND BELOW GROUND, SHAFTS, AND RAISES)		
GROUP 1	20.67	5.17
GROUP 2	21.02	5.17
GROUP 3	21.12	5.17
GROUP 4	21.37	5.17
GROUP 5	21.52	5.17
GROUP 6	21.67	5.17
GROUP 7	21.92	5.17

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1 - Brakeman

GROUP 2 - Motorman

GROUP 3 - Compressor

GROUP 4 - Air Tractors; Grout Machine; Gunnite Machine; Jumbo  
Form

GROUP 5 - Concrete Placement Pumps; Mucking Machines and Front  
End Loaders, Underground, Slusher; Mine Hoist Operator; Mechanic

GROUP 6 - Mechanic Welder

GROUP 7 - Mole

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ENGI0009B 04/23/2001

	Rates	Fringes
POWER EQUIPMENT OPERATORS:		
GROUP 1	18.52	5.17
GROUP 2	18.87	5.17
GROUP 3	19.22	5.17
GROUP 4	19.37	5.17
GROUP 5	19.52	5.17
GROUP 6	19.67	5.17
GROUP 7	20.43	5.17

NOTE: Any equipment listed below being used in tunnel work, below or above ground shall be paid not less than \$2.00 per hour above the listed wage rates.

#### POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1 - Air compressor, oiler, brakeman, drill operator - smaller than Williams MF and similar, tender to heavy duty mechanic and/or welder, operators of 5 or more light plants, welding machines, generators, single unit conveyor, pumps, vacuum well point system, tractor, under 70 hp with or without attachments compressors, 360 C.F.M. or less

GROUP 2 - Conveyor, handling building materials, ditch witch and similar trenching machine, fireman or tank heater, road, forklift, haulage motor man, pugmill, portable screening plant with or without a spray bar, screening plants, with classifier, self-propelled roller, rubber-tires under 5 tons, grade checker

GROUP 3 - Asphalt screed, asphalt plant, backfiller, bituminous spreader or laydown machine; cableway signalman, caisson drill, William MF, similar or larger; C.M.I. and similar, concrete batching plants, concrete finish machine, concrete gang saw on concrete paving, concrete mixer, less than 1 yd., concrete placement pumps, under 8 inches, distributors, bituminous surfaces, drill, diamond or core, drill rigs, rotary, churn, or cable tool, elevating graders, equipment, lubricating and service engineer, engineer fireman, grout machine, gunnite machine, hoist, 1 drum, hydraulic backhoes, wheel mounted under 3/4 yd., loader, barber green, etc.; loader up to and including 6 cubic yards, motor grader/blade, rough; road stabilization machine, rollers, self-propelled all types over 5 tons, sandblasting machine, single unit portable crusher, with or without washer, tie tamper, wheel mounted, tractor, 70 hp and over with or without attachments, trenching machine operator, winch on truck

GROUP 4 - Cable operated crane, track mounted, cable operated power shovels, draglines, clamshells, and backhoes, 5 cubic yards and under, concrete mixer over 1 cubic yard, concrete paver 34E or similar, concrete placement pumps, 8 inches and over, crane, 50 tons and under, hoist, 2 drums, hydraulic backhoe, 3/4 yds and over, loader, over 6 cubic yards, machine doctor, mechanic, mixer mobile, motor grader/blade, finish, multiple unit portable crusher, with or without washer; piledriver, scrapers, single bowl under 40 cubic yards, self-propelled hydraulic crane, tractor with sideboom, truck mounted hydraulic crane, roto-mill and similar, welder

GROUP 5 - Cable operated power shovels, draglines, clamshells and backhoes over 5 cubic yards, crane 51 to 90 tons carrier mounted, electric rail type tower crane, hoist, 3 drum or more, quad nine and similar push unit, scrapers single bowl including pups 40

cubic yards and tandem bowls and over mechanic - welder (heavy-duty)

GROUP 6 - Cableway, crane (91 to 140 tons), climbing tower crane, crawler or truck mounted tower crane, derrick, wheel excavator, tower crane, rail type, belt or elevating loader

GROUP 7 - Cranes (140 tons and over)

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IRON0024F 08/01/2001		
	Rates	Fringes
IRONWORKERS:		
STRUCTURAL, ORNAMENTAL, AND		
REINFORCING	21.00	7.36

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LABO0086A 05/01/2001		
	Rates	Fringes
LABORERS:		
GROUP 1	11.75	3.64
GROUP 2	15.10	3.64
GROUP 3	15.60	3.64

#### LABORER CLASSIFICATIONS

GROUP 1 - Janitors; Yardmen

GROUP 2 - Minimum labor, Traffic Control Director(certified); including caissons to 8' carrying Reinforcing Rods; Dowel Bars; Fence Erectors; Fire Watchers on power plants and oil refineries; Gabion Basket and Reno mattresses; Signaling, Metal Mesh; Nursery Man (including seeding; mulching and planting trees); pipe plants and yards; Shrubs and flowers; Stake Caser; Traffic Control Devices; Tie Bars and Chairs in Concrete; Paving; Waterproofing Concrete; Air, Gas, Hydraulic Tools and Electrical Tool Operators; Barco Hammers; Cutting Torches; drill; diamond and core drills; Core, diamond, air track including but not limited to; Joy, Mustang, PR-143, 220 Gardner-Denver, Hydrosonic, and water blaster operator; Chuck Tender; Electric hammers; Jackhammers; Hydraulic Jacks; Tampers; Air Tampers; Boring Machines; Air Hydraulic Boring machines; Automatic Concrete Power Curbing Machines; Concrete Processing Material; form setters; Highways, Streets, and Airports runways; Operators of concrete saws on pavement (other than gangsaws); Power operated Concrete Buggies; Hot Asphalt Labor; Asphalt Curb Machines; Paving Breakers; Transverse Concrete Conveyor Operator; Cofferdams; Boxtenders; Caisson 8' to 12'; Caisson Over 12'; Jackhammer Operators in Caissons over 12'; Labor applicable to Pipe coating or Wrapping; Pipe Wrappers, Plant and Yard; Relining Pipe; Hydroliner (a plastic may be used to waterproof); Pipelayer on Underground Bores; Sewer, Water, Gas, Oil and Telephone Conduit; Enamalers on Pipe, inside and out, Mechanical Grouters; Monitors; Jeep Holiday Detector Men; Pump Operators; Rakers; Vibrators; Hydro- broom,

Mixer Man; Gunnite Nozzelmen; Shotcrete Operator; and chain saws, gas and electric; Sand Blaster; Licensed Powdermen; Powdermen and Blaster; Siphons; Signalmen; Dumpman/spotter;

Grade Checker.

GROUP 3 - Plug and galleys in dams; Scalers; any work on or off Bridges 40' above the ground performed by Laborers working from a Bos'n Chair, Swing Stage, Life Belt, or Block and Tackle as a safety requirement

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LABO0086B 05/01/2001

	Rates	Fringes
LABORERS: (TUNNEL)		
GROUP 1	15.05	3.64
GROUP 2	15.95	3.64
GROUP 3	16.05	3.64
GROUP 4	17.15	3.64
GROUP 5	17.10	3.64

TUNNEL LABORER CLASSIFICATIONS

GROUP 1 - Outside Laborer - Above ground

GROUP 2 - Minimum Tunnel Laborer, Dry Houseman

GROUP 3 - Cable or Hose Tenders, Chuck Tenders, Concrete Laborers, Dumpmen, Whirley Pump Operators

GROUP 4 - Tenders on Shotcrete, Gunniting and Sand Blasting; Tenders, core and Diamond Drills; Pot Tenders

GROUP 5 - Collapsible Form Movers and Setters; Miners; Machine Men and Bit Grinders; Nippers; Powdermen and Blasters; Reinforcing Steel Setters; Timbermen (steel or wood tunnel support, including the placement of sheeting when required); and all Cutting and Welding that is incidental to the Miner's work; Tunnel Liner Plate Setters; Vibrator Men, Internal and External; Unloading, stopping and starting of Moran Agitator Cars; Diamond and Core Drill Operators; Shotcrete operator; Gunnite Nozzlemen; Sand Blaster; Pump Concrete Placement Men.

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LABO0086C 05/01/2001

	Rates	Fringes
LABORERS: (SHAFTS, RAISES, MISSILE SILOS AND ALL UNDERGROUND WORK OTHER THAN TUNNELS)		
GROUP 1	16.05	3.64
GROUP 2	16.20	3.64
GROUP 3	16.30	3.64
GROUP 4	16.55	3.64
GROUP 5	16.65	3.64
GROUP 6	17.25	3.64

LABORER CLASSIFICATIONS (SHAFTS, RAISES, MISSILE SILOS AND UNDERGROUND)

GROUP 1 - Laborers; Topmen; Bottommen; Cagers

GROUP 2 - Chucktenders; Concrete Laborers; Whirley Pump Operators

GROUP 3 - Tenders in Shotcrete Gunniting and Sandlasting;  
Tenders on Core and Diamond Drills; Pot Tenders

GROUP 4 - Diamond and Core Drill Operators; Gunnite Nozzlemen;  
Shotcrete Operators; Sandblasters; and Pump Concrete Placement  
Men

GROUP 5 - Any employee performing work underground from a bos'n  
chair, swinging stage, life belt or block and tackle as a safety  
requirement

GROUP 6 - Collapsible Form Movers and Setters, Miners, Machine  
Men and Bit Grinders; Nippers; Powdermen and Blasters;  
Reinforcing Steel Setters; Timbermen (steel or wood tunnel  
support, Including the Placement of Sheeting when Required) and  
all Cutting and Welding that is Incidental to the Miner's Work;  
Liner Plate Setters; Internal and External Vibrator Men;

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LABO0086D 05/01/2001	Rates	Fringes
LABORERS:		
Removal or encapsulation of Asbestos Material (including removal of asbestos from mechanical systems that are going to be scraped) and work involving the removal, handling, or dealing with toxic or hazardous waste	18.45	3.64
WATER, SEWAGE AND GAS LINES		
Janitors, Yardmen	11.75	3.64
Laborers, Traffic Control		
Director	14.35	3.64
Pipelayer (one per crew)	14.85	3.64

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PAIN0079G 08/01/2001	Rates	Fringes
PAINTERS:		
BRUSH	19.41	4.02
SPRAY AND SWING STAGE	20.41	4.02

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PLAS0577D 05/01/2000	Rates	Fringes
CEMENT MASONS	20.20	3.52
HAZARDOUS AND TOXIC WASTE CONSTRUCTION SPECIALIST:	22.20	3.52
CONCRETE SPECIALIST: Including finishing; grouting		

patching and curbing	23.20	3.52
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PLUM0003E 07/01/2001

	Rates	Fringes
DENVER COUNTY		
PLUMBERS	25.67	5.99

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PLUM0020E 07/01/2001

	Rates	Fringes
ALAMOSA, BACA, BENT, CHAFFEE, COSTILLA, CROWLEY, CUSTER, FREMONT, HUERFANO, KIOWA, LAS ANIMAS, MINERAL, OTERO, PROWERS, PUEBLO, RIO GRANDE & SAGUACHE		

PLUMBERS & PIPEFITTERS (Including HVAC Work):

Free Zone - 0 - to 40 miles	19.85	6.17
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Zone 1 - 40 miles and over: \$19.85 per hour + \$32.00 per day per diem will be paid on projects over 40 miles (Zone 1) measured in practical driving miles by the shortest route, beginning at 5th and Main Streets in Pueblo, Colorado, when the employee stays overnight or drives their own vehicle.

Hazardous Pay: Add \$2.20 per hour to \$19.85 base rate. Hazardous pay applies to projects at chemical plants, steel mills, cement plants, power generator plants, process piping at manufacturing plants, food processing plants, and all projects which may present a health hazard or serious personal injury.

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PLUM0058E 07/01/2001

	Rates	Fringes
CHEYENNE, EL PASO, AND TELLER, ELBERT (SOUTHERN PORTION INCLUDING THE TOWNS OF ELBERT, MATHERSON AND SIMLA), LINCOLN (INCLUDING THE TOWN OF GEONA AND ARRIBA IN THE SOUTHERN PORTION OF COUNTY), KIT CARSON (INCLUDING TOWNS OF DFALGLER, SEIBERT, VONA, STRATTON AND BETHUNE), DOUGLAS (INCLUDING TOWNS OF LASPUR AND PALMER LAKE), PARK (INCLUDING TOWNS OF FAUPLAY, HARTSEL, AND LAKE GEORGE) COUNTIES		

PLUMBERS & PIPEFITTERS:	24.30	6.40
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PLUM0145B 05/01/2001

	Rates	Fringes
MONTEZUMA COUNTY		
PLUMBERS	21.78	5.50

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PLUM0208J 07/01/2001

	Rates	Fringes
DENVER COUNTY:		



PIPEFITTERS	25.77	5.89
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TEAM0435A 05/01/2000

	Rates	Fringes
TRUCK DRIVERS:		
GROUP 1	14.21	5.27
GROUP 2	14.93	5.27
GROUP 3	15.27	5.27
GROUP 4	15.80	5.27
GROUP 5	16.45	5.27
GROUP 6	17.25	5.27

#### TRUCK DRIVER CLASSIFICATIONS

GROUP 1 Pickup, Greasemen, Servicemen and Ambulance Drivers, Battery Men, Sweeper Truck, Flat Rack Single Axle and Manhaul, Shuttle Truck or Bus, Flat Rack Tandem Axle.

GROUP 2 Dump Truck Driver to and including 6 cubic yards, Dump Truck Driver over 6 cubic yards to and including 14 cubic yards, Fork Lift Driver, Straddle Truck Driver, Lumber Carrier, Liquid and Bulk Tankers Single Axle, Tandem Axle, Semi or Combination, Euclid Electric or Similar, Multipurpose Truck Specialty and Hoisting, Truck Drivers Fuel Truck, Grease Truck, Combination Fuel and Grease.

GROUP 3 Truck Driver Snow Plow, Truck Driver Dumptor Type Jumbo and similar type equipment, Dump Truck Driver of 14 cubic yards to and including 29 cubic yards, Floats.

GROUP 4 Dump Truck Driver over 29 cubic yards to and including 79 cubic yards, Cement Mixer Agitator Truck over 10 cubic yards to and including 15 cubic yards, Tire Man, Distributor Truck Driver, Cab Operated Distributor Truck Driver.

GROUP 5 Dump Truck Driver over 79 cubic yards, Mechanic, Heavy Duty Diesel Mechanic, Body Man, Welders or Combination Men.

GROUP 6 Low Boy.

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(v)).

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In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations

indicate unions whose rates have been determined to be prevailing.

#### WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U. S. Department of Labor  
200 Constitution Avenue, N. W.  
Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor

200 Constitution Avenue, N. W.  
Washington, D. C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U. S. Department of Labor  
200 Constitution Avenue, N. W.  
Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.  
END OF GENERAL DECISION

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GENERAL DECISION CO010002 11/09/01 CO2  
General Decision Number CO010002

Superseded General Decision No. CO000002

State: Colorado

Construction Type:  
BUILDING

County(ies):  
EL PASO

BUILDING CONSTRUCTION PROJECTS (does not include residential  
construction consisting of single family homes and  
apartments up to and including 4 stories)

Modification Number	Publication Date
0	03/02/2001
1	03/09/2001
2	04/20/2001
3	05/04/2001
4	07/06/2001
5	08/10/2001
6	11/09/2001

COUNTY(ies):  
EL PASO

ASBE0028A 01/01/2001		
	Rates	Fringes
ASBESTOS WORKERS/INSULATORS (Includes application of all insulating materials, protective coverings, coatings and finishings to all types of mechanical systems and asbestos removal)	17.12	4.85
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BRCO0007A 05/01/2001		
	Rates	Fringes
TILE SETTERS	22.42	5.66
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BRCO0007B 05/01/2001		
	Rates	Fringes
TILE FINISHERS	17.97	5.26
-----		
CARP0001E 05/01/2001		
	Rates	Fringes
CARPENTERS (Including Drywall Hanging, Acoustical Ceiling Installation and Batt Insulation)	19.80	5.50
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ELEC0113B 06/01/2001		
	Rates	Fringes
ELECTRICIANS (Includes Low Voltage and Fiberoptic Work)	23.35	3%+8.14
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ENGI0009E 04/23/2001		
	Rates	Fringes
POWER EQUIPMENT OPERATORS:		
Backhoe, under 3/4 yd.	19.22	5.17
Backhoe, 3/4 yd. and over	19.37	5.17
Cranes		
50 tons and under	19.37	5.17
51 to 90 tons	19.52	5.17
91 to 140 tons	19.67	5.17
140 tons and over	20.43	5.17
Front End Loader:		
up to and including 6 cy	19.22	5.17
over 6 cubic yards	19.37	5.17
Belt & Elevating	19.67	5.17
Mechanic/Equipment Welder	19.52	5.17
Oiler, Assistant to Engineer	18.52	5.17

CO010002-2

11/09/2001

-----  
\* LABO0720B 05/01/2001

	Rates	Fringes
LABORERS, Unskilled	12.95	3.86

-----

PAIN0930A 07/01/2000

	Rates	Fringes
GLAZIERS	23.64	4.40

-----

PLUM0058A 07/01/2001

	Rates	Fringes
PIPEFITTERS (Including HVAC) & PLUMBERS (Mechanical Contracts):	24.30	6.40

-----

SFCO0669A 04/01/2001

	Rates	Fringes
SPRINKLER FITTERS	26.51	7.50

-----

\* SHEE0009B 07/01/2001

	Rates	Fringes
SHEET METAL WORKERS (Includes HVAC Ductwork and Architectural/ Roofing)	25.34	8.35

-----

SUCO1014A 09/20/1993

	Rates	Fringes
BRICKLAYERS/STONEMASONS	14.85	
CEMENT MASONS	13.00	
DRYWALL FINISHERS	12.58	2.44
HOD CARRIERS/BRICKMASON TENDERS	9.20	
IRONWORKERS, Structural	12.30	1.77
LABORERS: Cement	8.00	
PAINTERS (Excluding Drywall Finishing)		
Brush	11.16	
Paperhanger	13.25	
Roller	11.81	
POWER EQUIPMENT OPERATORS: Blade	14.00	1.35
ROOFERS	13.00	2.62
TRUCK DRIVERS	11.25	

CO010002-3

11/09/2001

-----  
WELDERS - Receive rate prescribed for craft performing operation  
to which welding is incidental.  
=====

Unlisted classifications needed for work not included within  
the scope of the classifications listed may be added after  
award only as provided in the labor standards contract clauses  
(29 CFR 5.5(a)(1)(v)).  
-----

In the listing above, the "SU" designation means that rates  
listed under that identifier do not reflect collectively  
bargained wage and fringe benefit rates. Other designations  
indicate unions whose rates have been determined to be  
prevailing.

#### WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can  
be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a  
position on a wage determination matter
- \* a conformance (additional classification and rate)  
ruling

On survey related matters, initial contact, including requests  
for summaries of surveys, should be with the Wage and Hour  
Regional Office for the area in which the survey was conducted  
because those Regional Offices have responsibility for the  
Davis-Bacon survey program. If the response from this initial  
contact is not satisfactory, then the process described in 2.)  
and 3.) should be followed.

With regard to any other matter not yet ripe for the formal  
process described here, initial contact should be with the Branch  
of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U. S. Department of Labor  
200 Constitution Avenue, N. W.  
Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an

interested party (those affected by the action) can request  
review and reconsideration from the Wage and Hour Administrator  
(See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N. W.  
Washington, D. C. 20210



The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U. S. Department of Labor  
200 Constitution Avenue, N. W.  
Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.  
END OF GENERAL DECISION

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**A B C D E F G H I**  
**J K L M N O P Q R**  
**S T U V W X Y Z**  
**a b c d e f g h i j k l m**  
**n o p q r s t u v w x y z**  
**1 2 3 4 5 6 7 8 9 10**

**A B C D E F G H I J K L M**  
**N O P Q R S T U V W X Y Z**  
**a b c d e f g h i j k l m**  
**n o p q r s t u v w x y z**  
**1 2 3 4 5 6 7 8 9 10**

Note: Above lettering styles are Helios Extra Bold Condensed and Helios Bold II.  
Helvetica Black Roman and Helvetica Bold Roman are acceptable substitutes.

STANDARD  
ALPHABET & NUMERALS  
OFFICE OF THE DISTRICT ENGINEER  
OMAHA, NEBRASKA  
REV. NOVEMBER, 1982

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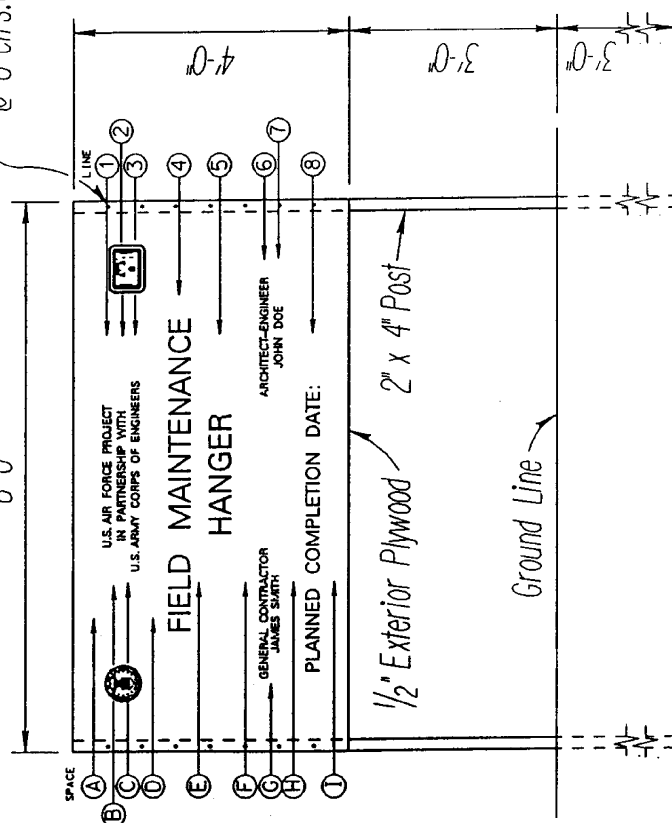
NOTES:

1. Posts to be S4S.
2. Plywood shall be exterior type, A-C grade.
3. Before painting, surface to be clean, dry, free from grease and sanded.
4. Paint with one prime coat zinc oxide and two finish coats of Color Number 20122 in Fed. Std. 595A, brown gloss exterior type enamel, conforming to Fed. Specs. TT-E-489.
5. All lettering to be Color Number 21875 in Fed. Std. 595A, white gloss, exterior type enamel.
6. Decalcomania for Corps of Engineers Insignia and HQ USAF Engineering and Services Directorate Emblem will be furnished by the Contracting Officer for installation by the Contractor.
7. All exposed wood (posts, supports, back, etc.) shall be painted the same background color as the sign. 8'-0"

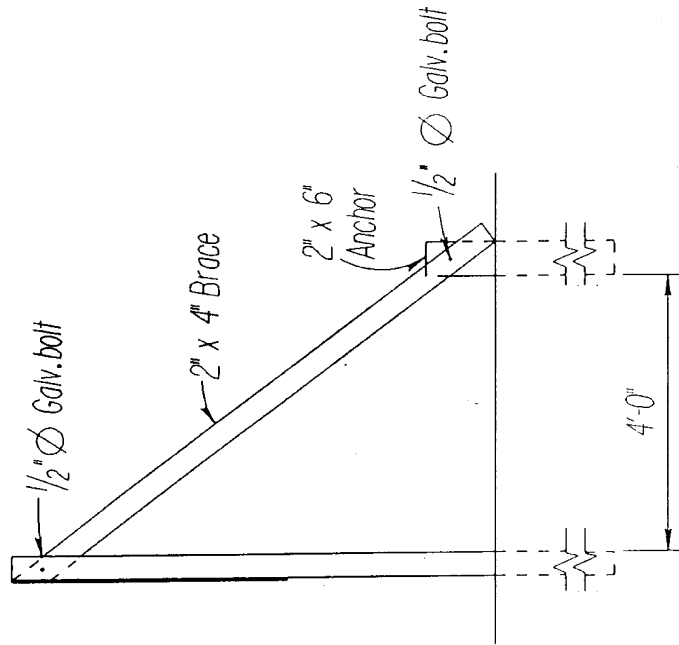
SCHEDULE

SPACE	HEIGHT	LINE	DESCRIPTION	LETTER HEIGHT	STROKE
A	5"	1	U.S. AIR FORCE PROJECT	1.5"	$\frac{3}{16}$ "
B	1"	2	IN PARTNERSHIP WITH	1.5"	$\frac{3}{16}$ "
C	1"	3	U.S. ARMY CORPS OF ENGINEERS	1.5"	$\frac{3}{16}$ "
D	5"	4	PROJECT NAME	4"	$\frac{1}{2}$ "
E	3"	5	PROJECT NAME CONT'D (IF REQ.)	4"	$\frac{1}{2}$ "
F	5"	6	GENERAL CONTRACTOR/A-E	1.5"	$\frac{3}{16}$ "
G	1"	7	GENERAL CONTRACTOR/A-E	1.5"	$\frac{3}{16}$ "
H	4"	8	PLANNED COMPLETION DATE	2.5"	$\frac{1}{4}$ "
I	5"				

Nail with 8d galv. nails  
@ 6" ctrs. each post



FRONT VIEW



END VIEW

STANDARD  
PROJECT SIGN  
U.S. AIR FORCE MCP PROJECTS  
OFFICE OF THE DISTRICT ENGINEER  
OMAHA, NE  
REV. OCTOBER 1993

00800AT2

OD15-9A22

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CONTROL TOWER  
PN: XQPZ400500  
USAF ACADEMY, COLORADO

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FORM 4288, SUBMITTAL REGISTER (EXAMPLE)  
FORM 4025, TRANSMITTAL FORM  
01332 SUBMITTALS DURING DESIGN  
AR 420-17 CHAPTER 4, ACCOUNTING FOR REAL PROPERTY  
DD FORM 1354 TRANSFER AND ACCEPTANCE OF MILITARY REAL  
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1336ATT CODE ANALYSIS & ADA ARCHITECTURAL COMPLIANCE  
CHECKLIST  
01338 100 PERCENT DESIGN REQUIREMENTS  
01355 ENVIRONMENTAL PROTECTION  
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PART 2 NOT USED

PART 3 NOT USED

-- End of Section Table of Contents --

SECTION 01001

SUMMARY OF WORK

PART 1 SUMMARY OF WORK

1.1 FUNCTION

1.1.1 Control Tower

The new Control Tower located at the USAF Academy, Colorado will control the glider and powered aircraft used in cadet training. The facility will be designed in the International Style of architecture, and will be a highly visible building being located a short distance from Interstate Highway 25.

The facility is being designed to allow for adequate comprehensive programs for both cadet students and air traffic control personnel. The anticipated average daily attendance for this facility is approximately 80 people, 50 cadet students, 10 air traffic controllers, 6 student air traffic controllers, and VIP tours.

This facility will consist of two different operations, cadet training and air traffic control. The cadet area will contain a large lobby, briefing room with storage, sub briefing rooms, flight commander's office, logger room, rope storage, toilets, and break room. The air traffic control area includes offices, conference room, radio maintenance, electronics, telephone equipment, storage, coffee bar, elevator equipment, toilets, observation deck, and control cab.

The Control Tower and Support Building will be located in the Airfield Area, centered between the Center Sailplane Runway and the East Runway; west of RSU Road, and east of Taxiway H. The Control Tower will be visible from Interstate 25. It's unique design will provide a favorable impression to passersby. The site is directly south of the existing Sailplane Hangar. An asphalt parking lot located on the site will be removed.

A new Ground to Air Transmitter Receiver (GATR) building will be constructed with this project. The GATR building will be located near an existing metal building #9205. Two 30 meter antenna towers will be erected near the GATR building. The GATR building site is east of Airfield Drive, near the area of the existing fire station.

Storage building #9205 and the old GATR building 9215 shall be removed under this project. The existing Control Tower #9212, and Runway Supervisory Unit and Ground Support Buildings #9229, and 9232 will also be removed with this project.

Included with the construction of the Control Tower, Support Building, and GATR Building, are a 91-stall privately-owned vehicle parking lot, access drives, service drives, walks, patios, an aircraft display pad, a bus stop and turnaround drive, and a 3-compartment dumpster screenwall. Rock surfacing and seeding are also included. Landscaping will be limited to low maintenance shrubs. Boulders will be provided in the rocked areas.

## 1.2 GOALS AND OBJECTIVES

Based on user interviews during the pre-design conference and design charrette the following goals were defined:

### 1.2.1 Codes

Building codes and life safety codes shall be met or exceeded. All applicable codes are listed in each section.

### 1.2.2 Building Durability

Materials and equipment will be chosen for their durability with minimum or nonexistent maintenance. The building design will conserve manmade resources and energy usage.

### 1.2.3 Alternate Construction Methods

Alternate methods and materials, which represent value-for-the-money, will be considered for all aspects of the project, except where prohibited by the RFP. The intent of this design-build proposal is to present an overall design concept with some definition of the systems to be used. It shall be the responsibility of the design-build contractor to assemble the best value-priced construction systems for this project that meet or exceed the design criteria set forth herein.

Perscriptive Requirements: Specific direction is provided and alternate methods and materials will not be considered, unless directed otherwise by the Contracting Officer.

Performance Requirements: Specific direction has not been provided and alternate construction methods will be considered as long the system meets or exceeds the design criteria given.

### 1.2.4 Sustainable Design Technology

To the extent referenced in the solicitation, the Contractor shall provide a facility which utilizes sustainable design principles. The basic objectives are to:

- 1) Reduce consumption of energy, land and other non-renewable resources.
- 2) Minimize waste of materials, water, and other limited resources.
- 3) Consider the cost of energy dollars while creating livable, healthy and productive environments that maintain comfort, health, and safety for the people using the facility.

Green Building Technology and Whole Building Design are referenced names involving sustainable design principles.

#### Related References:

ETL 1110-3-491 (31 January 2000) Sustainable Design for Military Facilities

#### Web Sites to Consider for Sustainable Design:

EPA Designated product (available at <http://www.epa.gov/cpg>)

Green Building Council: <http://www.usgbc.org>

Whole Building Design Guide: <http://www.wbdg.org/>

Energy Star Building Program - Environmental Protection Agency:  
<http://www.epa.gov/energystar/>

Leadership in Energy and Environmental Design Green Building Rating System  
Criteria (LEED) U.S. Green Building Council:  
<http://www.usgbc.org/programs.leed.htm>

U. S. Department of Energy website:

**[www.eren.doe.gov/buildings/build\\_design.html](http://www.eren.doe.gov/buildings/build_design.html)**

**Air Force Space Command:**

USAF Environmentally Responsible Facility Guide  
(<http://www.afcee.brooks.af.mil/green/facilitiesguide/erfguide.pdf>)

#### 1.2.5 Reference Documents

There may be references (outside design resource documents) included in this RFP that are not specifically referred to in the criteria requirements (i.e. List of References). Such references (i.e. U.S.A.F. Physical Fitness Design Guide) are intended only as support documents for design to the designer, unless referred to specifically in the criteria sections. These references are not intended to add additional scope to the project. If conflicts arise between this request for proposal and these references, the requirements stated in this RFP shall govern.

#### 1.3 BUILDING SIZE

The Control Tower and support building has a target-size of 1060 gross square meters.

#### 1.4 DRAWINGS

Site Plan and Floor Plans are included with this request for use in further developing this design.

#### 1.5 OPERATION AND MAINTENANCE REQUIREMENTS/TRAINING

##### 1.5.1 Operation and Maintenance Manuals

The intent of the O&M Manuals are to promote and maximize the efficiency, economy, safety, and effectiveness of the life cycle operation, maintenance, and repair of the facility. Operation and maintenance manuals as required by the Technical Specifications (Divisions 1 thru 16) shall be provided.

##### 1.5.2 Training

The Contractor shall provide operational and maintenance training for all systems furnished under this contract. The training will be for the operating and maintenance personnel. The training shall be put on by the system manufacturer. The training shall not take place until the operation

and maintenance manuals are submitted and approved. The Contractor shall video tape the training session on VHS tapes and provide tapes to the Government.

## 1.6 OVERVIEW OF DESIGN-BUILD PROCESS

### 1.6.1 Overview

Since the early 1980s Congress has urged the military services to explore alternative construction methods, such as "Design-Build," which includes both design and construction under a single contract. This process is similar to "one-step turnkey selection procedures" and is defined in Title 10 of the United States Codes, Section 2862.

### 1.6.2 Process

The design-build process uses a Request for Proposal (RFP) to solicit for design and construction of a facility by a single contractual entity, such as a design-build firm, or joint venture between architect-engineer (A-E) and construction firm, or a construction management (CM) firm joint venture with an A-E and a construction firm. A design-build RFP states the project functional requirements, design and engineering criteria, technical performance specifications, and proposal evaluation factors. Potential contractors develop their proposals for the government to evaluate competitively, with the contract award based on a combination of technical merit and price.

In general, the RFP is a conceptual design document and the design-build contractor is responsible for completing the design and constructing the project. The RFP has developed the site plan and building design and given the facility an architectural character. These designs, with minor deviations allowed for detailing and constructibility, must be carried through to construction. The design-build contractor is responsible for all other designs on the project, such as the HVAC system, as long as they fit within the established criteria, and can be built on time and within budget.

After award of the contract, the design-build contractor will prepare a series of design submittals for review by the Government, so that design and criteria compliance can be effectively monitored for compliance. After approval of the final design, construction can begin. On-site construction activities shall not begin until all final corrected plans, specifications and design analysis for the entire project (as defined in Section 00800) have been accepted by the Government (for purposes of beginning construction), and construction documents are received).

## 1.7 DESIGN-BUILD CONTRACTOR REQUIRED A/E SERVICES

The following is a condensed summary of Section 01332, "SUBMITTALS DURING DESIGN" contained elsewhere in this document. Refer to this Section for the full requirements.

### 1.7.1 Dimensions

Design, products (if available in metric) and construction for the project shall be accomplished using hard metric expressions of measurement. All measurements in the technical performance specifications sections are shown in metric. Soft metric conversions from their English units are permitted for modular construction products, unless the application of the product requires it to coordinate dimensionally into the 100 mm building module.

Modular construction products are brick, concrete block, suspended ceiling systems, recessed lighting, and other manufactured components with dimensions based upon a four (4) inch (100 mm) building module.

#### 1.7.2 Professional Licenses

The award of contract will be made to one qualified contractual entity who will be responsible for design completion and the entire construction process for the facility. This contractual entity shall employ qualified building design professionals with appropriate state licenses.

#### 1.7.3 Request For Proposal - Binding Information

The information contained in this Request for Proposal (RFP) shall be considered binding unless specifically waived by the Contracting Officer. The successful offerer's proposal, along with any clarifications and/or best and final offers are a binding part of this contract. Site design, building design, architectural character and engineering/performance criteria shall be implemented through construction by the design-build contractor.

#### 1.7.4 Evaluation of Systems

As part of the basic services, the design-build contractor shall evaluate building systems and components for their possible inclusion into the design. If these systems and components meet the specified design and performance criteria in the RFP, they may then be incorporated into the work.

#### 1.7.5 Document Requirements

##### 1.7.5.1 Design documents at all stages of design include:

Construction drawings.

Specifications.

Design analysis narrative with calculations for all disciplines.

Magnetic media at the 100 percent corrected final design only.

##### 1.7.5.2 Drawing Requirements

All design drawings shall be accomplished using metric (SI) measurement. Prepare 594 mm x 841 mm full-size drawings and half-size drawings in accordance with the Omaha District CADD Standards Manual (Available at the following internet address: <ftp://155.77.239.151/pub/ae/ACADstd.pdf>).

The design-build contractor shall submit the design at various stages of completion, plus the final documents, for review and comment. These stages are:

60 percent design submittal.

100 percent design submittal.

100 percent corrected final design.

##### 1.7.5.3 60 Percent Design Requirements

Drawings, specifications, design analysis and calculations for all disciplines at an approximate 60 percent level of completion.

Color boards for SID. NOTE: SID package shall be final at the 60% submittal. The 100% submittal shall be updated as required.

1.7.5.4 100 Percent Design Requirements

Incorporate all comments from the 60 percent review.

Drawings, specifications, design analysis and calculations for all disciplines at 100 percent level of completion. All aspects of the project are complete.

Updated Color boards; SID.

1.7.5.5 100 Percent Corrected Final Design

Incorporate comments from the 100 percent design submittal.

Magnetic media.

1.8 SEQUENCE OF DESIGN-CONSTRUCTION

The schedule for design-construction shall meet the requirements as set forth in the provisions of the contract. See Section 00800 SPECIAL CONTRACT REQUIREMENTS for additional requirements.

PART 2 NOT USED

PART 3 NOT USED

-- End of Section --

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    - 1.14.3.2 Manholes

- 1.14.4 Gas Distribution System
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PART 2 NOT USED

PART 3 NOT USED

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SITE WORK

PART 1 SITE WORK

1.1 REFERENCES

AMERICAN WATER WORKS ASSOCIATION (AWWA)

- |           |  |
|-----------|--|
| AWWA M17  | (1989) Installation, Field Testing, and Maintenance of Fire Hydrants |
| AWWA C651 | (1992) Disinfecting Water Mains                                      |

DEPARTMENT OF THE AIR FORCE

- |             |  |
|-------------|--|
| TM 5-813-5  | (3 Nov 86) Water Supply, Water Distribution [Ref: AFM 88-10, Vol 5]  |
| TM 5-813-7  | (2 Sep 86) Water Supply for Special Project [Ref: AFM 88-10, Vol 7]]   |
| TM 5-814-1  | (4 Mar 85) Sanitary and Industrial Wastewater Collection - Gravity Sewers and Appurtenances [Ref: AFM 88-11, Vol 1]  |
| TM 5-814-2  | (15 Mar 85) Sanitary and Industrial Wastewater Collection-- Pumping Stations and Force Mains [Ref: AFM 88-11, Vol 2] |
| TM 5-820-1  | (August 87) Surface Drainage Facilities for Airfields and Heliports [Ref: AFM 88-5, Chap. 1]                         |
| TM 5-822-5  | (June 92) Pavement Design for Roads, Streets Walks, and Open Storage Areas (June 92) [Ref: AFM 88-7, Chap. 1]        |
| TM 5-822-11 | (June 93) Standard Practice For Sealing Joints and Cracks in Rigid and Flexible Pavements                            |

AMERICAN SOCIETY OF TESTING AND MATERIALS (ASTM)

- |             |   |
|-------------|---|
| ASTM D 977  | (1991) Emulsified Asphalt                           |
| ASTM D 2027 | (1976; R 1992) Cutback Asphalt (Medium-Curing Type) |
| ASTM D 2028 | (1976; R 1992) Cutback Asphalt (Rapid-Curing Type)  |

ASTM D 2397 (1994) Cationic Emulsified Asphalt

HANDICAPPED STANDARDS (HS)

ADAAG (January 1998) Accessibility Guidelines  
for Buildings and Facilities and Appendix

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

NOAA ATLAS 2 (1973) Precipitation-Frequency Atlas of  
the Western United States

AMERICAN ASSOCIATION OF STATE HIGHWAY & TRANSPORTATION OFFICIALS  
(AASHTO)

AASHTO A Policy on Geometric Design of Highways  
and Streets

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI D6.1 (1988) Manual on Uniform Traffic Control  
Devices for Streets & Highways

MILITARY HANDBOOKS (MH)

MIL-HDBK-1008C (10 Jun 1997) Fire Protection for  
Facilities Engineering, Design, and  
Construction

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 24 (1995) Installation of Private Fire  
Service Mains and Their Appurtenances

STATE OF COLORADO SPECIFICATIONS

Highway Specifications Colorado Highway Specifications

1.2 OMAHA DISTRICT CORPS OF ENGINEERS STANDARD DETAILS AND CADD CELLS.

The Omaha Districts Civil and Environmental standard details and CADD cells are available on the Omaha District FTP site. See website identified in Section 01332 SUBMITTALS DURING DESIGN. These standards and cells are available for the Contractor's use. References to using exact details and drawings are found in this section. In those cases, the Contractor shall use the referenced standard drawings and/or details.

1.3 SURVEY

1.3.1 Field Survey.

The Contractor shall use actual field survey data in the preparation of his drawings. The field survey data to be used in the development of the design submittal is available to the Contractor on CD-ROM furnished with this solicitation. The information is in a 3-d Autocad 2000 metric drawing file. A digital terrain model file, which was created using Microstation Inroads software, is also being furnished. The survey data information was

gathered by a topographical survey performed in January of 2002. Contours were gathered at 0.25 meter intervals. Survey data is being provided for the areas of construction and demolition, except for the area of Building 9215, and the strip of the existing electrical duct bank along RSU Road (See Sheet P1.01.) It is the Contractor's responsibility to gather field data as required for these areas and to provide any additional survey that may be required to design and construct the Control Tower project.

#### 1.3.2 Other Pertinent Data.

Information provided by the engineering survey shall be field verified by the Contractor. Below grade utility data was obtained from "best-available" as-built mapping.

### 1.4 STAGING AND CONTRACTORS ACCESS

#### 1.4.1 Staging Area

The location of the Contractor staging area shall be as shown on the Location Plan. Staging area shall be returned to its original condition upon completion of construction.

#### 1.4.2 Contractors Access Route

The Contractor's access route to the project location shall be approximately as shown on the Location Plan. Contractor shall provide means of keeping Taxiway G free from dirt and debris at all times.

#### 1.4.3 Contractors Stockpile Area/Borrow Site

Stockpile and borrow sites are not available on the installation. See paragraph, "Borrow and Waste," below.

### 1.5 DEMOLITION AND REMOVAL

#### 1.5.1 General Requirements

The Contractor shall remove all pavement, utilities, and site structures required to design and construct the new Control Tower, support building, and Ground to Air Transmitter Receiver building. All existing utilities to remain shall be protected during the demolition and construction process. All materials shall be disposed of outside the limits of Government controlled lands. Disposals shall be in accordance with federal, state, and local regulations. The Contractor shall notify the Contracting Officer if any material to be disposed of is found to contain hazardous, toxic, biological or radiological substances. Rubbish and debris shall be removed from Government property daily to avoid accumulation at the project site. Demolition shall be specified in UFGS Section 02220A DEMOLITION.

#### 1.5.2 Building Removals

The following buildings shall be removed:

a. Building 9212, the existing Control Tower. Surfaces disturbed by the removal of the tower shall be replaced in kind. The area of the existing Control Tower's footprint shall be seeded.

b. Buildings 9229 and 9232. Building 9229 is a Runway Supervisory Unit (RSU) and Building 9232 is a Ground Support Facility. The area disturbed

by the removal of these buildings shall be surfaced with pavement matching the apron surrounding the buildings.

c. Building 9205. Building 9205 is an existing Metal Storage Facility. A new facility, the Ground to Air Transmitter Receiver (GATR) Building, will be constructed at this site. A fence around the existing transformer and two concrete pads at the rear of the building shall also be removed.

d. Building 9215. Building 9215 is the existing Ground to Air Transmitter Receiver (GATR) Facility. The facility is a prefabricated concrete building, approximately 38 square meters. The asphalt apron around the building, the asphalt access drive to the building, telephones line servicing that originate at the existing control tower, four wood telephone poles, and three support poles shall also be removed.

#### 1.5.3 Building Removal Requirements

All buildings to be demolished, with the exception of Building 9205, shall remain operational until the new buildings are complete and operational. Building removals shall be complete including foundations and footings. Utilities supporting the buildings shall be removed, cut, capped, and abandoned in place, at a point 1.5 meters outside the foundation wall. Exterior mechanical equipment shall be removed. Pavements shall be removed as required to perform the building demolition. Generators at Building 9215 and 9215 shall be turned over to the Government. See attached photos (Attachment No. 2) and as-built drawings of the existing buildings.

#### 1.5.4 Pavement Removals/Utility Protection

The Contractor shall avoid running utilities underneath buildings, streets, sidewalks, and parking lots where at all practicable. In cases where it is necessary for the utilities to cross existing streets, sidewalks, and parking lots the Contractor shall install the lines by boring and jacking methods. No open trenching will be allowed unless written permission is obtained and approved by the Air Force Academy. When open trench methods are approved, streets, sidewalks, and parking lots shall be sawcut, removed and replaced as required to construct the new water system. Portions of walks and concrete pavements requiring removal shall be removed to the nearest contraction joint.

#### 1.5.5 Utility Interference

All existing utilities, including but not limited to storm drains, electrical, sewer, gas, water, and communication lines that are crossed during installation of the new water system shall remain in service during construction. If this is not possible, all outages shall be coordinated with the Contracting Officer's Representative. All underground utilities from field data and surveys, site investigations, and digging permit locates, shall be marked within and adjacent to areas of the work. All work areas shall be investigated with detection devices for cables and pipelines, to confirm locations, identify unknown utilities, and establish depths. All underground utilities potentially disturbed by the work shall be found by hand digging prior to mechanical trenching or excavating in the vicinity. The Government Representative shall be notified of detection activities 48 hours in advance. Detection devices shall be on-site at all times.

#### 1.6 NEW CONSTRUCTION

The location and construction of the new buildings, roads, access drives, walks, parking, utilities and landscaping shall be as indicated on the attached drawings and in these specifications. A new Ground to Air Support Receiver (GATR) Building (Building No. 9205) and Control Tower/Support Building (Building 9231) will be constructed with this project.

#### 1.6.1 Ground to Air Support Receiver (GATR) Building

The site layout for the new GATR building shall be completely designed by the Contractor. The general location for the new GATR building shall be near existing Building 9205 which is being removed. The building and towers shall be located outside the 7:1 ratio airfield clearance line. The ratio line is shown in Attachment No. 2B. The precise location must be approved by the Government. The layout shall include a 7.3-meter wide, gravel surfaced, pull-off lane to the facility, similar to the existing dirt road now providing access to the storage building. See attached survey. Two gravel surfaced parking stalls shall be provided near the building. A concrete walk shall be provided from the stalls to the entrance stoop of the new building. Two new antenna towers shall be provided. One tower, No. 10014, shall be located to the north of the facility, and the other, No. 10015, shall be located to the south of the facility. See Section 01007 for additional information on the GATR Building and Antennas. The Contractor shall provide a preliminary Site Plan of the GATR Building to the Contracting Officer for the purpose of an environmental assessment. This preliminary plan shall use the data from the attached field survey.

#### 1.6.2 Control Tower and Support Building

The general location of the new Control Tower and Support Building shall be as shown on the drawings. However, the exact location may be revised slightly by the Contractor as needed to accommodate the final project layout. All site layout shall be subject to approval by the Government. The new building is required to be handicapped accessible.

##### 1.6.2.1 Walks

Concrete walks, 100 mm thick, shall be provided as shown on the attached drawings. Minor alterations may be made as the site design is further developed. The installation uses a 2.1 meter grid system and all walks widths shall be a division or multiplication of this measurement. The walk leading from the new Support Building to the existing Sailplane Hangar, and the wider area of walk west of the bus stop shall be 4.2 meters wide. The entrance walks leading from the parking lots and bus stop shall be 2.1 meters wide. The narrower walks as shown on the attached Site Plan shall be 1.05 meters wide. Contraction and expansion joints shall form a square pattern on the walks; i.e., 2.1 meter wide walks, shall have a 2.1 meter joint spacing. Handicap access curb ramps shall be provided when walks intersect with drive. See following paragraph, "Patio," for description of walk surrounding the new tower.

##### 1.6.2.2 Patio

A concrete patio shall be constructed below the new Control Tower's cab. The patio shall extend beyond the outside edge of the Tower's balcony by .525 meters. The patio shall be edged with a 2.1 meter wide shrub bed and a walk constructed of 1.05 meter square and .525 meter wide x 1.05 meter long decorative, hydraulically-pressed, concrete pavers. Walks, perpendicular to the patio and of concrete construction, shall be centered



on the exterior edges of the patio as shown on the attached Site Plan. An additional concrete patio, to the rear, or west side of the Control Tower shall be constructed as shown on the attached Site Plan.

#### 1.6.2.3 Display Pad

A display pad, 11.7 meters square, shall be constructed of decorative, hydraulically-pressed, concrete pavers. A pattern, similar to the one shown on the attached Site Plan shall be incorporated into the pad by varying paver color and size within the pad. Finish, style, and color of pavers for the pad and walk around the patio shall be coordinated with the USAF Academy and complement the overall color scheme of the exterior materials and surfaces. The Academy's 2.1 meter wide grid system shall be followed in the design of the pad.

#### 1.6.2.4 Parking

A 92-stall, privately-owned vehicle (POV) asphalt parking lot with concrete curb and gutters shall be constructed to the west and east of the new facility. Four of the stalls shall be designated for handicapped parking. Striping, signage, and ramps shall be provided for all handicapped stalls as required by the ADAAG January 1998 Accessibility Guidelines for Buildings and Facilities and the Appendix. A minimum distance of between the new building and parking lots is required. Regular parking stalls shall be a minimum of wide and long. Driving lanes shall be a minimum of wide. Parking stalls shall be delineated with white-painted stripes. Provide inside turning radii of at the intersections with roads; into the parking lots and into driving aisles; and into parking stalls. Provide concrete curb and gutter as shown on the attached Site Plan. Asphalt drives, also with concrete curb and gutters, shall be provided for accessing the parking areas.

#### 1.6.2.5 Service Drive

The Contractor shall provide one wide concrete service drive. The drive will provide vehicle access to the mechanical room on the east side of the new Support Building. A 2.1 meter square contraction and expansion joint pattern shall be followed on the drive in an effort to resemble a walk rather than a drive. Two demountable bollards shall be placed in drive from the outside wall of the building. The bollards shall be placed to prevent vehicle access when they are in position. Design of the demountable bollards shall be coordinated with the USAF Academy.

#### 1.6.2.6 Bus Stop

A new 7.3 meter wide drive, and 3.6 meter wide bus stop, shall be provided. The drive will serve as a turn-around drive for a 12 to 13.7 meter long military bus entering on the north, and allow for two-way traffic for vehicles servicing the dumpsters and requiring access to the Sailplane Hangar and mechanical equipment of the new support building. Turning requirements for all vehicles using the drive shall be met.

#### 1.6.2.7 Dumpster Screenwall

A new concrete pad, access apron and dumpster screenwall shall be provided at the location shown on the attached Site Plan. The screen wall shall be constructed to match the new support building and provide storage for three dumpsters. The wall shall be approximately 11 meters wide, x 3.5 meters deep, and a minimum of 2.1 meters high. Three, extra-heavy duty,

double-swing, metal panel doors shall be constructed to provide access to the dumpsters by the servicing vehicle. A walk and opening in the wall shall provide easy access for pedestrians.

### 1.6.3 Landscaping

The Landscape Plan shall be designed to visually-enhance the new facility with color, form, interest, and to soften the otherwise hard surfacing planned for the site. Landscaping will be limited to low growing, maintenance-free, deciduous and evergreen shrubs. Taller shrubs and trees will not be acceptable plant choices because they may attract birds to the airfield arrea. Contractor shall be responsible for maintaining new plant material in a healthy growing condition beginning with the completion of the last day of planting operation for a period of 12 months or until 12 months after all work under this entire Contract has been completed and accepted, whichever period is longer. No permanent irrigation system will be provided with this project. Shrubs species selected must be able to survive with only nature's watering, once the Contractor's 12 month establishment and maintenance period has ended.

The Landscape Plan will include the following plantings:

TYPE	MINIMUM QUANTITY (EACH)	MINIMUM SIZE
SHRUBS		
Deciduous & Evergreen	66	container

Plant materials shall be climatized to the local area for a period of one growing season prior to planting and consist of the following. All shrub planting beds shall be surfaced with a commercial weed-barrier fabric and a thick surface of 25-50-meter rock mulch. Mulch shall be a solid color derived from the River Rock used in the rock surfacing. Concrete edging shall be provided at locations shown on the attached Site Plan. Edging shall be .26 meters wide and .2 meters deep, with 25 mm protruding above the finished grade. The exposed edging shall have chamfered edges and a smooth-troweled finish. Expansion and contraction joints shall emphasize the 2.1 meter spacing. Plants as shown on the attached Site Plan do not necessarily indicate quantity or type. Landscape plantings shall be specified in UFGS Sections 02930A EXTERIOR PLANTING and 02935A EXTERIOR PLANTING MAINTENANCE.

### 1.6.4 Decorative Rocks and Boulders

#### 1.6.4.1 Rock

Areas within the limits of rock surfacing as shown on the attached Site Plan shall be surfaced decorative River Rock. Size of rock shall vary between the areas formed by the walks and concrete edging. Rock color shall vary in the areas formed by the walks and concrete edging in front of the support building. The color(s) shall be derived from the River Rock mix. Care shall be taken to choose an interesting, but not gaudy, variation and application of color, such as tan and buff or rose in front of the building and grey in shrub beds. Coordinate with base personnel to ensure compliance with base standards. Size of rock shall vary from a minimum of 25 mm to 150 mm. Thickness of the surface for the areas of varying rock color and size shall be a minimum of 100 mm thick, and be adjusted upwards for the larger size rocks.

#### 1.6.4.2 Boulders

Boulders shall be placed throughout the rock surfaced areas and along the parking lots at distances and spacing sufficient to deter vehicular access within 25 meters of the building. Parallel, uniform lines of boulders are not acceptable. Boulder type and color shall complement the River Rock and other stones being used in the lawn area. Sizes shall range from .45 to 1.2 meters in circumference.

#### 1.6.5 Turf

All turfed areas disturbed by construction and demolition activities, including those disturbed by Contractor's staging activities shall be seeded. The requirements below shall be incorporated into UFGS Section 02921A SEEDING.

##### 1.6.5.1 Soil Preparation

The disturbed site shall be tilled to a minimum depth of six inches, then harrowed or raked to produce a firm seed bed for planting. Some sites may not require tillage to provide a suitable seed bed, but this determination will only be made by Air Force Academy personnel. Sites without suitable surface soils (loam, sandy loam, clay loam, loamy sand) for plant growth shall be covered with 4-6 inches of weed-free topsoil that shall be incorporated by disking. Large rocks (greater than 2 inch diameter) and other debris shall be cleared from the site. Any necessary structures (e.g., water bars, turnouts) to reduce runoff and prevent water erosion shall be constructed prior to seeding.

##### 1.6.5.2 Seeding Varieties

Any modification of the specified seed mix shall be coordinated with the Contracting Officer and Natural Resources. All seed mixes shall use certified varieties, be free of noxious weeds, and have been tested for purity and germination within one year of the planting date. If possible, all seed should originate from sources not more than 250 miles south, 150 miles north, and 200 miles east or west of the U.S. Air Force Academy. Note that the pounds of Pure Live Seed (PLS) per acre specified below are for drilled seeding only. If the seed is broadcast, the PLS/acre rate shall be doubled.

1. For dry upland areas with a wide variety of soil and slope conditions, the following seed mix shall be planted:

<u>SPECIES</u>	<u>(Variety)</u>	<u>PLS RATE PER ACRE</u>
Little Bluestem	(Pastura)	2.0
Blue Grama	(Hachita)	1.0
Side Oats Grama	(Vaughn)	2.0
Green Needlegrass	(Lodorm)	1.5
Sand Dropseed		0.5
Western Wheatgrass	(Barton)	3.5

2. If a rapid, temporary grass cover is required, perennial ryegrass may be added to the above seed mix, but the PLS seeding rate of the native grasses shall be unchanged:

<u>SPECIES</u>	<u>(Variety)</u>	<u>PLS RATE PER ACRE</u>
Little Bluestem	(Pastura)	2.0
Blue Grama	(Hachita)	1.0
Side Oats Grama	(Vaughn)	2.0
Green Needlegrass	(Lodorm)	1.5
Sand Dropseed		0.5
Western Wheatgrass	(Barton)	3.5
Perennial Ryegrass	(Tetraploid)	6.0

#### 1.6.5.3 Seeding Dates

Seeding shall normally occur between October 15 and May 15. If planting after May 15, but before August 1, then supplemental irrigation of 0.75 inches/week shall be provided during the first growing season to promote seedling survival. No seeding shall occur between August 1 and October 14.

#### 1.6.5.4 Seeding Methods

Drill seeding or broadcast seeding shall be used depending on the slope of the disturbed site and the size of the area.

1. Slopes less than 3:1 - Seed shall be drilled using a rangeland or grass drill with a small seed/legume box and an agitator box for fluffy or bulky seed. Seed rows shall be spaced 7-10 inches apart, and planted 0.5 to 0.75 inches deep. The drill shall have double disk furrow openers with depth bands and packer wheels. Seeding shall be accomplished by following the contour of the slope. The drill shall be calibrated each day or whenever changing seed mixes to ensure even seed distribution.

2. Slopes greater than 3:1 and areas less than 0.5 acre - Seed shall be broadcast by hand, mechanical spreader, or hydraulic equipment. Broadcast seeded areas shall be raked or harrowed to incorporate the seed into the soil at a depth not exceeding 0.75 inches. Seed shall not be mixed in a tank with hydromulch and broadcast.

#### 1.6.5.5 Mulching

Weed-free native hay, weed-free straw, virgin wood fiber hydromulch, or erosion control blankets shall be used to promote germination and seedling establishment. Native hay, straw, or hydromulch shall be applied at 2000 pounds/acre on slopes less than 3:1. Native hay or straw shall be crimped into the soil to a depth of 3-4 inches, and shall protrude above the ground 3-4 inches. Hydromulch shall be applied using the recommended rate of an organic tackifier. Erosion control blankets shall be used whenever reclaiming slopes greater than 3:1 or along drainage areas where erosion is probable.

#### 1.6.5.6 Weed Control

If weed competition becomes abundant on the seeded area, the site shall be mowed 1-2 times per year at a height just above the leaves or seedheads of the native vegetation.

#### 1.6.5.7 Reseeding

If a partial or total seeding failure is apparent after the second growing season, unvegetated areas shall be reseeded in the same manner described above. Appropriate site preparation practices shall be used to create a suitable seedbed for planting, but any established native vegetation shall be undisturbed. Areas that erode and lose seed before establishment can occur shall be immediately reseeded during the next suitable planting period.

#### 1.6.5.8 Turf Establishment

Contractor shall be responsible for establishing and maintaining a healthy stand of turf for a period of 90 days after turfing operations under this Contract are complete or until all work under this entire Contract has been completed and accepted, whichever period is longer. Contractor is to provide temporary lawn sprinklers for all seeded areas for a minimum of 60 days or until complete establishment of the seeded area.

### 1.7 CONSTRUCTION AREA/SAFETY FENCING.

The boundaries of the construction site and staging area shall be identified with flagging or 1.2 meter tall orange plastic fencing and signage throughout the construction period. The fencing or flagging shall be installed on the south side of the existing asphalt drive south of the Sailplane Hangar running between RSU Road and Taxiway H for as long as practical from a construction standpoint, allowing for vehicular traffic on the drive. When this location is no longer feasible, the fencing location shall be adjusted to define the entire construction boundary. At a minimum, signage shall include the name of the Contractor and a phone number for emergencies. The signage shall conform with the base signage standards. The number of cones and or barriers shall be minimized to the number required by the appropriate governing safety standard. Upon completion of construction, all fence materials shall be disposed of outside the limits of Government-controlled lands.

### 1.8 PAVEMENTS

#### 1.8.1 Pavement Sections

The Contractor shall be responsible for design of all pavements using the traffic information provided below. Design of pavement structures for roads and parking areas shall be determined by the Contractor using the methods described within TM 5-822-5. Pavement design calculation sheets for the procedures contained in TM 5-822-5 are included as an attachment. See end of the RFP, Attachment No. 6. Pavements for permanent installations shall be designed for a life of 25 years. Pavements at USAF Academy shall be designed for seasonal frost conditions. Soil data for preliminary pavement design shall be obtained from the attached Preliminary Soils and Foundation Information. **Note: Contractor shall base final pavement design on his own Final Geotechnical Report. See end of the RFP, Attachment No. 1.**

#### 1.8.2 Design Traffic

- a. Pavement for all parking areas shall be flexible hot-mix asphalt type with concrete curb and gutter. Design shall be for a class "F" facility with a traffic category of II. Traffic will be composed of 90 percent passenger cars, panel trucks and pickup trucks, and up to 10 percent two-axle trucks.
- b. Pavement for the service drive and access roads shall be flexible hot-mix asphalt type with concrete curb and gutter. Design shall be for a class "E" facility with a traffic category of III. Traffic will be composed of 84 percent passenger cars, panel trucks and pickup trucks, 15 percent two-axle trucks, and 1 percent three-, four-, and five-axle trucks.
- c. Pavement for the dumpster access apron shall be concrete with integral curb. Design shall be for a class "E" facility with a traffic category of III. Traffic will be composed of 84 percent passenger cars, panel trucks and pickup trucks, 15 percent two-axle trucks, and 1 percent three-, four-, and five-axle trucks.
- d. Pavement for the GATR pull-off lane and parking stalls shall be a minimum of 150 mm aggregate surface course over 150 mm compacted subgrade.

#### 1.8.3 Rigid Pavement Design Curves

Two curves are presented in Chapter 12 of TM 5-822-5 to determine the required thickness of plain concrete pavement. The curves in Figure 12-1 were developed assuming free edge stresses and should be used for roads and streets and other pavements where wheel loads will repeatedly travel near or over the pavement edge. Edges of concrete pavement designed using this curve are not required to be thickened. The curves in Figure 12-2 were developed assuming 25 percent load transfer across pavement joints. Figure 12-2 should be used for parking areas and storage areas where wheel loads will seldom travel near the pavement edge. Pavement edges will not require thickening except at entrances where wheel loads repeatedly cross the pavement edge. Figure 12-2 may be used for roads and streets if the pavement edges are thickened.

#### 1.8.4 Rigid Pavement Joint Layout

A typical joint layout for plain concrete road intersections is shown in Figure 13-1 of TM 5-822-5. A typical joint layout for plain concrete roads and parking areas is shown in Chapter 15 of TM 5-822-5. Spacing and layout of joints in plain concrete pavement shall be such that the number of slabs requiring reinforcement will be kept to a minimum. Odd-shaped slabs should be reinforced in two directions normal to each other using a minimum of 0.05 percent of steel in both directions. The entire area of the slab should be reinforced. An odd-shaped slab is considered to be one in which the longer dimension exceeds the shorter dimension by more than 25 percent or a slab which essentially is neither square nor rectangular. Odd-shaped slabs will generally be reinforced with steel welded wire fabric. Slabs in which a structure is placed shall also be reinforced with welded wire fabric. Each slab to be reinforced with welded wire fabric will be marked with an "R" on the joint layout plan. Details showing typical layout of joints at intersection as indicated in Figure 13-1 of TM 5-822-5 will be provided when applicable.

#### 1.8.5 Sidewalks

Concrete sidewalks shall be a minimum of 4 inches thick. See paragraph

"Walks," above for contraction joint spacing. Expansion joint spacing shall not exceed 40 feet.

#### 1.8.6 Utility Crossings

The Contractor shall avoid running utilities underneath buildings, streets, sidewalks, and parking lots where at all practicable. In cases where it is necessary for the utilities to cross existing streets, sidewalks, and parking lots the Contractor shall install the lines by boring and jacking methods. No open trenching will be allowed unless written permission is obtained and approved by the Air Force Academy. When open trench methods are approved, streets, sidewalks, and parking lots shall be sawcut, removed and replaced as required to construct the new utilities. Portions of walks and concrete pavements requiring removal shall be removed to the nearest contraction joint.

#### 1.8.7 Sidewalk, Curb and Gutter, and Pavement Specifications

Sidewalks and pavements shall be constructed in accordance with Colorado Highway Specifications where indicated. Unless otherwise specified, unit price clauses shall be deleted. These requirements shall be incorporated into the Omaha District guide specification Section 02560 (COLORADO) PAVEMENTS FOR SMALL PROJECTS. An unedited copy of Section 02560 is included at the end of RFP, Attachment No. 3B. The Contractor shall be responsible for editing this specification.

##### 1.8.7.1 Concrete Sidewalks and Curbs and Gutters

Concrete sidewalks and curbs and gutters shall be specified in Omaha District guide specification Section 02560 (COLORADO) PAVEMENTS FOR SMALL PROJECTS. Expansion joints in concrete sidewalks shall be sealed with cold-applied sealant which is stone or grey in color.

##### 1.8.7.2 Bituminous Wearing and Intermediate Courses

Bituminous wearing and intermediate courses shall conform to the requirements in the Omaha District guide specification Section 02560 (COLORADO) PAVEMENTS FOR SMALL PROJECTS. The maximum size aggregate used in bituminous concrete shall be approximately equal to, but always less than for the wearing course thickness and for the intermediate course thickness. The total thickness of bituminous concrete shall not be less than 2 inches. Where the total thickness of bituminous concrete requires more than one lift, an intermediate course may be specified beneath the wearing course.

Disintegrated granite shall not be used for production of any aggregate and the processed aggregate shall contain not more than 2.0 percent by weight of disintegrated granite particles in that portion of the total sample larger than the 4.75 mm sieve and not more than 4.0 percent in any individual sieve size listed in the required aggregate gradation for that portion larger than the 4.75 mm sieve. A disintegrated granite particle is defined as a soft, crumbly particle of igneous rock having a visible crystalline grain size and consisting essentially of feldspar and quartz with lesser amounts of micas and/or amphiboles and pyroxenes. Generally, the rock particle will be stained by iron oxide and the feldspar grains will have a dull, highly fractured appearance. The individual mineral grains are so weakly bonded that the particle will crumble under moderate pressure. When tested by Test Method COE CRD-C 130 the particle would be classified as soft.

#### 1.8.7.3 Bituminous Prime Coat

A bituminous prime coat shall be used at the option of the Contractor. Bituminous prime coat will be used when it is anticipated that the constructed base course may be damaged by rain, wind, or traffic prior to placement of the bituminous concrete pavement. Bituminous prime coat shall conform to the requirements found in Omaha District guide specification Section 02560 (COLORADO) PAVEMENTS FOR SMALL PROJECTS. Bituminous prime coat shall be: liquid asphalt conforming to the requirements of ASTM D 2027, designation MC-30 or MC-70, at the Contractor's option, except that only MC-30 shall be used on dense graded base courses if MC-70 does not adequately penetrate the base course material. In lieu of cut-back asphalt, the Contractor may use cationic emulsified asphalt conforming to the requirements of ASTM D 2397, designation CSS-1 or CSS-1h.

#### 1.8.7.4 Bituminous Tack Coat

Contact surfaces of previously constructed pavement, curbs, manholes, and other structures shall be sprayed with a thin coat of bituminous material conforming to the requirements found in Omaha District guide specification Section 02560 (COLORADO) PAVEMENTS FOR SMALL PROJECTS. Unless otherwise directed or required, bituminous material shall be emulsified asphalt conforming to the requirements of ASTM D 977, designation SS-1 or SS-1h or cationic emulsified asphalt conforming to the requirements of ASTM D 2397, designation CSS-1 or CSS-1h.

#### 1.8.7.5 Aggregate Base Course

Aggregate base course shall conform to the requirements found in Omaha District guide specification Section 02560 (COLORADO) PAVEMENTS FOR SMALL PROJECTS and shall have a California Bearing Ratio (CBR) of at least 80.

#### 1.8.7.6 Rigid Pavement Base and Subbase Courses

Rigid pavement base course shall be placed directly underneath concrete and subbase course shall be placed beneath the crushed aggregate base course. Rigid base and subbase shall serve as a separation and/or filter layer and shall conform to the requirements found in Omaha District guide specification Section 02560 (COLORADO) PAVEMENTS FOR SMALL PROJECTS and shall have a California Bearing Ratio (CBR) of at least 50. Aggregates for 50 CBR subbase course shall consist of crushed quarry stone, crushed gravel (2 or more fractured faces) or a combination crushed gravel with fines.

#### 1.8.7.7 Concrete Pavement

Concrete pavement will generally be designed using a flexural strength of at 28 days age. Concrete shall conform to the requirements in the Omaha District guide specification Section 02560 (COLORADO) PAVEMENTS FOR SMALL PROJECTS.

#### 1.8.7.8 Joint Sealing

Joints in concrete pavements may be sealed with field molded sealants. Field molded joint sealants shall be specified in the Omaha District guide specification Section 02560 (COLORADO) PAVEMENTS FOR SMALL PROJECTS.

#### 1.8.7.9 Aggregate Surface Course



Aggregate surface course aggregate shall conform to the requirements in the Omaha District guide specification Section 02560 (COLORADO) PAVEMENTS FOR SMALL PROJECTS.

## 1.9 GRADING

### 1.9.1 General

Positive drainage shall be provided for all areas and existing drainage ways shall be utilized to the extent possible. It is desirable to direct drainage away from buildings to curb and gutter and or to new perimeter ditches. Swales between buildings and parking areas shall be avoided, if possible. Parking areas shall be graded such that storm water is directed off to the sides and not down the center of the parking area. Earthwork shall be balanced to the extent possible without compromising the design. The number of existing trees to be removed shall be kept to a minimum. No grading shall be done within drip lines of existing trees to be preserved.

Grading shall be specified in the Omaha District guide specification Section 02210 GRADING. The Contractor shall be responsible for editing the specification for the project. See end of the RFP, Attachment No. 3B.

### 1.9.2 Adjustment of Existing Structures

All manholes, valve boxes, or inlets of any nature within the project that do not conform to the new finish grade in either surfaced or unsurfaced areas shall be adjusted to the new finish grade. Where inlets, manholes, or valve boxes fall within a surfaced or unpaved roadway or parking, the existing frames and cover shall be removed and replaced with a heavy-duty frame and cover. The structure shall be adjusted as needed to fit the new conditions. All structures shall be of a type suitable for the intended use and shall conform to the requirements of the applicable section of these specifications.

### 1.9.3 Borrow and Waste

Borrow materials shall be obtained from sources outside the limits of Government-controlled land. The source of borrow material shall be the Contractor's responsibility. The Contractor shall obtain from the owners the right to procure material, shall pay all royalties and other charges involved, and shall bear all the expense of developing the sources, including rights-of-way for hauling. Any surplus suitable materials not required for fill shall be removed from the base. Non suitable materials shall be disposed of by the Contractor at his own expense and responsibility outside the limits of Government-controlled land.

### 1.9.4 Sidewalks and Curb and Gutter

Concrete walks shall have a transverse grade of 2 percent. Maximum longitudinal walk grade shall be 10 percent in freezing climates and 15 percent in non-freezing climates. Handicapped accessible walks with a longitudinal slope greater than 5 percent shall be considered a ramp. See FED STD 795 Uniform Federal Accessibility Standards for ramp requirements. Special attention shall be given to sidewalks that are on the north (shaded) side of buildings. These walks should be designed to ensure a freeze/thaw cycle does not result in the formation of ice on the walk. Ice on walks should be a safety consideration for all areas. The use of steps in walks will be avoided whenever possible. The use of single riser steps is especially discouraged. When steps are unavoidable, they should have at least three risers and will be provided with handrails. Double purpose

walks are a combination of a straight curb and a concrete walk. Their use shall be limited to area where the drainage flows away from the curb line or gutter.

1.9.5 Transverse Parking Area Grades

- a. Desirable minimum of 2 percent.
- b. Absolute minimum of 1.5 percent for flexible pavement and 1 percent for rigid pavement.
- c. Maximum of 2 percent at handicap parking.

1.9.6 Longitudinal Parking Area Grades

Maximum of 4 percent.

1.9.7 Ramp Grades

- a. Desirable maximum of 7 percent.
- b. Absolute maximum of 10 percent for short distances only.

1.9.8 Gutter Grades

- a. Desirable minimum of 0.8 percent.
- b. Absolute minimum of 0.5 percent.

1.9.9 Building Floor Elevation

Building finished floor elevation shall be set to ensure that the required minimum and maximum grades are met.

1.9.10 Grades Away From Building

- a. Minimum of 5 percent for .
- b. Maximum of 10 percent for .

1.9.11 Overlot Grades

Provide positive drainage for all areas.

- a. Minimum 1 percent for cohesionless sandy soils.
- b. Minimum 2 percent for cohesive soils or turfed areas.

#### 1.9.12 Ditch Slopes

Minimum grade of 1.0 percent for channelized flow.

#### 1.9.13 Ditches

An underground drainage system shall be designed for the the existing drainage ditch which is between the existing taxiway and the new Control Tower and Support Building. The storm drain shall be extended to the west as necessary to construct the two new structures. This system shall incorporate the existing drainage from the culvert(s) which currently drain the area in front of the Sailplane Hangar. All new ditches shall be graded at non-erodible slopes or the ditch shall be lined with an appropriate material to prevent erosion. A design storm with a return period of at least 2 years shall be used to determine erodibility of ditches and swales.

#### 1.10 ROAD GEOMETRIC DESIGN

Horizontal and vertical alignment shall be designed in accordance with AASHTO "A Policy on Geometric Design of Highways and Streets".

#### 1.11 STORM DRAINAGE

##### 1.11.1 Determination of Storm Runoff

For areas of up to about 1 square mile, where only peak discharges are required for design and extensive ponding is not involved; the computation of runoff will be accomplished by either the Rational Method or the method presented in TM 5-820-1. For larger areas, when suitable unit-hydrograph data are available or where detailed consideration of ponding is required, computation should be by unit-hydrograph and flow-routing procedures. If the method presented in TM 5-820-1 is used to determine the peak discharge, the minimum time of concentration for turfed or paved areas shall be 5 minutes.

##### 1.11.1.1 Design Storm Return Period

Storm drains and culverts shall be sized for a design storm with a return period of 10 years. Provisions shall be made to protect all buildings and critical structures from a major storm event with a return period of 100 years.

##### 1.11.1.2 Rainfall Depth-Duration-Frequency Data

Rainfall data for states in the western United States shall be obtained from NOAA ATLAS 2. Rainfall intensity-duration data developed by cities or regions may be used if available. Rainfall Intensity-Duration data for projects at U.S. Air Force Academy shall be obtained from the City of Colorado Springs Drainage Criteria Manual. The Contractor shall use the latest edition available.

##### 1.11.2 Storm Drainage System Design

The Contractor shall be responsible for design of the storm drainage system. An underground drainage system shall be designed for the the existing drainage ditch which is between the existing taxiway and the new Control Tower and Support Building. The storm drain shall be extended to the west as necessary to construct the two new structures. This system

shall incorporate the existing drainage from the culvert(s) which currently drain the area in front of the Sailplane Hangar. The new storm drainage system shall be coordinated with surrounding properties to ensure runoff from those sites are accounted for. The storm drainage system shall be designed so as to minimize the number of drainage structures required. Structures shall be located at all changes in direction of storm drain line, at the intersection of two or more storm drain lines, and where required to intercept rainfall runoff. The maximum distance between drainage structures shall be approximately 300 feet for conduits less than 30 inches in diameter. The maximum distance between drainage structures shall be approximately 500 feet for conduits 30 inches and greater in diameter. Storm runoff in streets and parking areas with curbing shall be collected using curb inlets or area inlets. The use of curb openings with flumes to drain water from parking streets and parking areas with curbing will not be permitted unless approved by the Government. Drainage of runoff from turfed areas onto pavements shall be minimized. Where possible, a minimum drop of 0.2 feet between inverts of equal diameter storm drain pipes shall be provided at the centerline of drainage structures. Where storm drain pipes are of different diameters, the pipe crown elevations should be matched at the drainage structure. Storm drain pipes shall have a minimum diameter of 12 inches. Storm drain lines shall be located outside of paved areas to the extent possible. Under no circumstance shall storm drain lines be located beneath buildings.

All storm drain pipe and structures shall be specified in UFGS Section 02630A STORM-DRAINAGE SYSTEM. Submittal of pipe samples are not required. The Contractor shall refer to the Corps of Engineers standard details for any storm drain details required by the design. The standard details are available at the Corps FTP site. The Contractor shall provide details for any other drainage structures not found in the Corps standard details.

#### 1.11.2.1 Hydraulic Design

New storm drain pipes shall be designed for gravity flow during the 10-year design storm unless otherwise approved by the Government. The hydraulic grade line shall be calculated for the storm drain system and all energy losses accounted for. Storm drain systems shall be designed to provide a minimum flow velocity of 2.5 feet per second when the drains are one-third or more full.

#### 1.11.2.2 Manholes

Diameter of manholes shall be large enough to accommodate pipes entering/exiting the manhole. Manhole cast iron frames shall have a minimum opening diameter of 24 inches. Galvanized steel ladders shall be provided in all manholes with a depth exceeding 12 feet in accordance with UFGS Section 02630A STORM-DRAINAGE SYSTEM.

#### 1.11.2.3 Area Inlets

Area inlets shall be properly sized and designed to accommodate the design flows.

#### 1.11.2.4 Curb Inlets

Locating parking area curb inlets at building entrances shall be avoided if possible. Curb inlets along two-lane streets shall be spaced and sized so that the flow in the gutter and ponded areas at low points do not cover the crown of the street.

#### 1.11.2.5 Head walls and Flared End Sections

Unless otherwise approved, head walls or flared end sections shall be provided at the ends of culverts and at storm drain outfalls. Protection from erosion and scouring at head wall and flared end section outfalls shall be provided as needed.

#### 1.11.2.6 Culverts

Culvert pipes shall have a minimum diameter of 18 inches wherever possible.

#### 1.11.3 Roof Drains

Downspouts and/or interior roof drains from the Control Tower and Support Building shall be connected to an underground roof drainage system. Roof drain outfall lines beyond 5 feet from the buildings shall be of the same materials as the exterior storm drainage system. Minimum diameters shall be 12 inches for lengths over 50 feet and 8 inches for lengths under 50 feet.

In addition, the diameter shall be at least 2 inches larger than the diameter of the line as it leaves the building. All changes in direction of outfall lines shall occur at storm drain structures except that cleanouts may be used in lines smaller than 12 inches. Drainage from the roof areas around the entry points to the facility shall be designed as to not cause an ice hazard.

#### 1.11.4 Storm Drain and Culvert Pipe

The Contractor shall select the appropriate storm drain and culvert pipe materials from the options specified in UFGS Section 02630A STORM-DRAINAGE SYSTEM. Pipe, bedding, and backfill shall be of adequate strength (or stiffness) to support the earth, live, and construction loads imposed on the pipe. Only pipe materials which have a minimum design service life of 50 years shall be allowed for permanent installations. As a minimum, all pipe joints shall be soil tight. The Contractor shall specify watertight pipe joints and flexible resilient pipe connectors at drainage structures when the water table is at or above the pipeline.

##### 1.11.4.1 Concrete Pipe

Reinforced concrete pipe shall be a minimum Class III. Type I cement may be used only when sulfates in the soil are 0.1 percent or less and dissolved sulfates in the effluent are 150 ppm or less. Type II cement may be used only when sulfates in the soil are 0.2 percent or less and dissolved sulfates in the effluent are 1,500 ppm or less. Only Type V cement may be used if sulfates in the soil exceed 0.2 percent or dissolved sulfates in the effluent exceed 1,500 ppm. Concrete pipe shall be assumed to have a minimum design service life of 50 years unless the Contractor determines that conditions at the site will reduce the service life. Concrete culverts and storm drains shall be protected by a minimum of 3 feet of cover during construction to prevent damage before permitting heavy construction equipment to pass over them during construction.

##### 1.11.4.2 Corrugated Metal Pipe

The service life of corrugated metal pipe shall be the sum of the lives of the nonmetallic protective coating, the metallic protective coating, and the basic metal pipe. The life of the basic metal pipe and metallic protective coating shall be the time to first perforation. The time to

first perforation for corrugated steel pipe shall be determined using the California Chart (California Division of Highways Test Method 643-B). Corrugated metal pipe shall not be allowed in areas where previous satisfactory service has not been achieved. Zinc-coated corrugated steel pipe shall not be allowed if the soil and water pH is less than 6 or greater than 8 or the minimum soil resistivity for the site is less than 2,500 ohm-cm. Aluminum-coated corrugated steel pipe shall not be allowed if the soil and water pH is less than 6 or greater than 9 or the minimum soil resistivity for the site is less than 1,500 ohm-cm. Bituminous coatings shall have a maximum allowable add-on service life of 10 years on the soil side and 2 to 10 years on the water side of the pipe. Stiffness of the corrugated metal pipe and soil envelope shall be such that the predicted long-term deflection shall not exceed 5.0 percent. Corrugated metal culverts and storm drains shall be protected by a minimum cover as recommended in Section 26 of AASHTO HB-16 during construction to prevent damage before permitting heavy construction equipment to pass over them during construction.

#### 1.11.4.3 Plastic Pipe

Stiffness of the plastic pipe and soil envelope shall be such that the predicted long-term deflection shall not exceed 7.5 percent. Plastic culverts and storm drains shall be protected by a minimum of 3 feet of cover during construction to prevent damage before permitting heavy construction equipment to pass over them during construction. Split couplers shall not be allowed for corrugated high-density polyethylene pipe. Plastic pipe shall be assumed to have a minimum design service life of 50 years unless the Contractor determines that conditions at the site will reduce the service life.

#### 1.12 TRAFFIC SIGNAGE AND STRIPING

Traffic signage and striping shall be provided for all new roads and parking areas. Signage and striping shall be designed in accordance with ANSI D6.1 Manual on Uniform Traffic Control Devices for Streets and Highways. Parking areas shall be striped with non-reflectorized paint. Roads and streets shall be striped with reflectorized paint. Traffic signs shall be specified in the Omaha District guide specification Section 02440 TRAFFIC SIGNS. An unedited version of Section 02440 has been included as an attachment. See end of the RFP, Attachment No. 3B. The Contractor shall be responsible for editing the specification for the project. Pavement markings shall be specified in UFGS Section 02763A PAVEMENT MARKINGS.

#### 1.13 EROSION AND SEDIMENT CONTROL

The Contractor shall be responsible for selecting and implementing Best Management Practices (BMPs) to minimize pollutants in storm water discharges associated with construction activity at the construction site. All erosion and sediment measures and other protective measures shall be maintained by the Contractor in effective operating condition. All temporary structural practices shall be removed once the corresponding disturbed drainage area has been permanently stabilized. In the State of Colorado, EPA has authority for the National Pollutant Discharge Elimination System (NPDES) on Federal Facilities. If construction activities results in the disturbance of 5 acres of land or more, coverage under the EPA Storm Water General Permit For Construction Activities (Colorado Permit No. COR10\*##F) is required. The Contractor and the Omaha District Corps of Engineers shall be co-permittees. The Contractor shall

be responsible for complying with the requirements in UFGS Section 01355 ENVIRONMENTAL PROTECTION and with the requirements of Omaha District guide specifications Section 01565 (FEDERAL FACILITIES COLORADO) NPDES PERMIT REQUIREMENTS FOR STORM WATER DISCHARGES FROM CONSTRUCTION SITES. The Contractor shall be responsible for editing and applying the requirements of Omaha District guide specifications Section 01356 STORM WATER POLLUTION PREVENTION MEASURES. An unedited guide specification Section 01356 have been included as attachment. See end of the RFP, Attachment No. 3B. Guide specification Section 01565 has been included as attachment. See end of the RFP, Attachment No. 3B. If coverage under the NPDES Permit is not required, Specification Section 01565 shall not be applicable.

#### 1.13.1 Temporary Construction Entrance

Tracking of mud from the construction site onto adjacent roads and streets shall be kept to a minimum. A temporary stabilized stone pad shall be constructed at points where vehicular traffic will be leaving the construction site and moving directly onto a paved road or street. It shall extend the full width of the vehicular ingress and egress area and have a minimum length of 70 feet. The entrance shall be maintained in a condition which will prevent tracking or flow of mud onto adjacent roads or streets. If conditions on the site are such that the majority of the mud is not removed by the vehicles traveling over the stone, the the tires of the vehicles shall be washed before entering the road or street. Any mud which is tracked onto roads or streets shall be removed at least once daily.

#### 1.13.2 Erosion Control Blanket

Bottoms and side slopes of ditches and any other disturbed slopes 1V on 3H or steeper shall be covered with an erosion control blanket immediately after seeding.

#### 1.13.3 Silt Fence

Silt fencing shall be installed below disturbed areas where erosion would occur in the form of sheet and rill erosion. The size of the drainage area above the silt fence shall not exceed one fourth of an acre per 100 feet of silt fence length. Silt fencing may be installed across ditches only when the maximum contributing drainage area is not greater than 1 acre. Silt fence constructed across a ditch shall have wire support and shall be of sufficient length to eliminate endflow.

#### 1.13.4 Straw Bale Barrier

Straw bale barriers may not be installed across ditches.

#### 1.13.5 Outlet Protection

Preformed riprap lined scour holes or other suitable measures shall be installed at outlets of culverts and storm drains as needed to prevent erosion.

#### 1.13.6 Storm Drain Inlet Protection

Storm drain inlet protection shall be installed around any new or existing storm drain inlets that will become operational before permanent stabilization of the corresponding disturbed drainage area has occurred. Storm drain inlet protection shall include either a sediment filter or an excavated area around the storm drain inlet.

#### 1.13.7 Rock Check Dam

Rock check dams may be installed in ditches which drain 2 to 10 acres. The allowable drainage area will be dependent on the gradation of the rock used to construct the check dam. The maximum height of the dam shall be 3 feet.

The center of the dam shall be at least 6 inches lower than the outer edges. For added stability, the base of the check dam may be keyed into the soil approximately 6 inches. The maximum spacing between the dams should be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam.

#### 1.13.8 Temporary Sediment Trap

Temporary sediment traps may be constructed below disturbed areas where the total drainage area is less than 3 acres.

#### 1.13.9 Temporary Sediment Basin

Temporary sediment basins may be constructed below disturbed areas where the total drainage area is equal to or greater than 3 acres.

#### 1.13.10 Other Controls

Other controls such as diversion dikes, level spreaders, temporary seeding, etc. may be used if deemed necessary by the Contractor.

### 1.14 UTILITIES

The Contractor shall avoid running utilities underneath buildings, streets, and parking lots where at all practicable. In cases where it is necessary for the utilities to cross existing undisturbed streets, the Contractor shall install the lines by boring and jacking methods. No open trenching will be allowed through existing undisturbed streets unless written permission is obtained and approved by US Air Force Academy. Open trenching may be used beneath existing roads that are scheduled for removal, relocation and resurfacing. Waterlines and sanitary sewer lines shall be connected to existing water and sewer mains located at the building site that connect to the Sailplane Hangar. The new distribution waterline shall be connected to the existing line located along Airfield Road adjacent to Building 9206, this connection will provide a distribution loop.

#### 1.14.1 CATHODIC PROTECTION

Corrosion protection shall be provided for all buried gray or ductile-iron piping, fittings, valves, and other water line appurtenances, regardless of pipe material. Corrosion protection shall consist of an anode type cathodic protection system. See Section 01007 Electrical Requirements.

#### 1.14.2 WATERLINES

a. All waterlines shall comply with applicable Local, State and Federal standards. Water distribution systems and service lines shall be designed and constructed in accordance with TI 814-1, TI 814-3, applicable U.S. Army Corps of Engineers Guide Specifications requirements. The Contractor shall be responsible for protection of existing waterlines. If any potable waterlines are damaged during construction, the Contractor must immediately



notify the Base Civil Engineering (CE) Office. The Contractor shall disinfect all new water lines and any remaining lines which do not remain fully pressurized during construction or connection. The Contractor shall notify the Base CE Office prior to disinfection of the water lines. The disinfection shall be in accordance with the American Water Works Association Standard AWWA C651, (1992), and shall not be considered complete until two consecutive days of bacteriological samples show no contamination. All bacteriological, lead and copper tests shall be performed by Environmental Protections Agency (EPA) certified laboratories. Copies of results of the analyses shall be forwarded to the Contractor upon receipt.

b. The Contractor shall design and provide all facilities required to deliver water to the project. Service connections or extensions to the existing water distribution system shall be made without interruption to service. The domestic demand for the new facility served shall be designed in accordance with the Uniform Plumbing Code Fixture Count Method. For design of the waterlines, use maximum Hazen-Williams "C" value of 130 for plastic pipe and 120 for other pipe materials. The Contractor shall provide an 8-inch distribution loop from the new site to the existing waterline adjacent to Building 9206.

#### 1.14.2.1 Water Distribution and Service Lines

##### a. Flow Requirements

Water shall be supplied by service lines of appropriate capacity to provide the flows determined to be necessary to meet all requirements of the new facility. A distribution line shall be included south of the building, and the service lines connected in a loop, providing water to the facility from two directions. The requirements include all domestic use, interior and exterior fire protection water, and lawn sprinkler/irrigation systems, as required. All new service lines shall be tied into the new 8-inch water line discussed above.

##### b. Service Connections

A maximum velocity of shall be used for metallic piping and shall be used for nonmetallic piping. Service connections shall be made via corporation stops, appropriate gooseneck connections, or tapping sleeves and valves. The number and maximum size of corporations stops shall be as specified in UFGS Section 02510A WATER DISTRIBUTION SYSTEM.

##### c. Dewatering, Hydrostatic Testing, and Flushing of Lines

The Contractor shall be responsible for implementing the terms and requirements of Section 01355 ENVIRONMENTAL PROTECTION for dewatering, hydrostatic testing, and flushing of lines after disinfection.

##### d. Domestic Service Stop Valve

Building shall be provided with separate service and stop valves in areas readily accessible to maintenance and emergency personnel. Stop valves located in walks are prohibited.

#### 1.14.2.2 Dedicated Fire Water Service Lines

a. Fire Flow Data

For determination and documentation of fire protection, the Contractor shall conduct and provide all fire hydrant flow tests. Data to be included with the flow tests are static pressures, residual pressures, flowrates, date and time tests were conducted, and name of personnel conducting the fire hydrant flow tests. The static pressures, residual pressures, flowrates, test hydrant and flow hydrants shall be shown on the appropriate contract drawings. Fire hydrant flow tests required for fire protection design shall be made in accordance with the procedures specified in AWWA M17, 1989 (Installation, Field Testing, and Maintenance of Fire Hydrants). The Contractor shall coordinate with the US Air Force Academy Fire Department and Base CE prior to conducting such tests. The Contractor shall submit fire hydrant flow test data with the design calculations. The Contractor shall become familiar with the water system at the US Air Force Academy prior to conducting the hydrant flow tests. Existing hydrant flow test data is provided for bidding purposes only. New hydrant flow test will be performed by the Contractor prior to design. The hydrant test data is as follows:

Test Hydrant: South of Building 9206 near the airfield  
Flow Hydrants: South of Building 9206 near Airfield Road  
Static: 100 psi  
Residual: 60 psi  
Residual Flow: 1031 gpm

b. Fire Hydrants

The Contractor shall be required to install fire hydrants for the new facility. One fire hydrant shall be located within a minimum of of the building fire department connection. All other hydrants shall be located in accordance with MIL-HDBK-1008C. Fire hydrant styles shall meet the requirements of the US Air Force Academy.

d. Dedicated Fire Line

The Contractor shall be required to provide a separate fire water service line to the building for interior fire sprinkler protection in accordance with NFPA 24, 1995, and MIL-HDBK-1008C. The fire water service line to the building shall be equipped with a Post Indicator Valve (PIV) that can be readily located by the fire department. The PIV shall not be placed closer than to the building it is serving. The PIV shall be protected by 150 mm steel pipe bollards, filled with concrete, painted and spaced in accordance with US Air Force Academy requirements.

1.14.3 WASTEWATER

All wastewater lines shall comply with applicable Local, State, and Federal standards.

1.14.3.1 Design Criteria

Sewage system shall be designed and constructed in accordance with TI 814-10 , and applicable U. S. Army Corps of Engineers Guide Specifications. The Contractor shall field verify the sanitary sewer system capacity and invert elevations to ensure that it is adequate for the flows generated by the new facilities. No interruption of service shall be allowed on the existing

sanitary sewer line. The Contractor shall coordinate the sequencing of construction as it affects the existing sanitary sewer line with the Base CE Office. Exterior building sanitary sewer service lines shall be 150 mm minimum diameter. The minimum pipe size between manholes shall be . All design slopes will be calculated using the Manning formula. The Contractor shall provide all calculations. The sanitary sewer shall connect to the sanitary manhole located on the site adjacent to the ditch.

#### 1.14.3.2 Manholes

Manholes are required at all changes of direction, slope, and size. Manholes shall be spaced not more than apart. Manholes shall be located at intersections of streets when possible. Avoid placing manholes where the tops will be submerged or subject to surface water inflow. Where the invert of the inlet pipe would be more than above the manhole floor, a drop connection will be provided. The Contractor shall provide all calculations.

#### 1.14.4 Gas Distribution System

See Section 01006 MECHANICAL REQUIREMENTS for instructions and engineering information relating to the design of the exterior gas distribution system.

### 1.15 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

#### 1.15.1 Trenches

Jacking and boring shall be required when an underground utility line crosses any undisturbed roadway. Sewer and water lines, mains or laterals, shall be placed in separate trenches. The separate trenches shall maintain a minimum horizontal separation of except where the bottom of the water line shall be at least above the top of the sewer. Sewers crossing above potable water lines shall maintain a vertical separation of and must be constructed of suitable pressure pipe or fully encased in concrete for a distance of on each side of the crossing.

The trench shall be excavated as recommended by the manufacturer of the pipe to be installed. Bedding and initial backfill material shall be in accordance with the manufacturers recommendations. Where no manufacturer's installation manual is available, trench walls shall be excavated to a stable angle of repose as required to properly complete the work. Trench excavations shall adhere to requirements prescribed in EM 385-1-1, September 1996, Safety and Health Requirements Manual. Special attention shall be given to slopes which may be adversely affected by weather or moisture content.

PART 2 NOT USED

PART 3 NOT USED

-- End of Section --

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## SECTION 01003

### ARCHITECTURAL BUILDING REQUIREMENTS

#### PART 1 ARCHITECTURAL BUILDING REQUIREMENTS

##### 1.1 FUNCTIONAL PLAN REQUIREMENTS

The facility design is based upon hard metric measuring units. All dimensions shown on the architectural sheets are indicated in millimeter (mm) units. The overall design and configuration can be altered as long as the square meter area is not exceeded. Design alterations will be allowed as required for material modular sizing considerations, economy of detail connections, access for utilities and handicap provisions.

Five building shall be demolished under this contract, Storage #9205, Control Tower #9212, GATR Building #9215, Control Tower #9229, and Runway Supervisory Unit #9232. These buildings shall not be demolished until after the completion of the new control tower facility.

The architectural components of the project are a single story support building housing administrative and classroom spaces, and a five story high control tower, with intermediate floor level below the cab. A new GATR building will be built to replace the existing GATR building #9205.

The control tower will include the following areas:

Lobby space with vestibule, briefing room, sub briefing rooms, cadet flight commander's office, logger room, rope storage, offices, conference room, radio maintenance, electronics, telephone equipment, break room, toilets and janitor's closet. Mechanical, electrical and communications spaces, and elevator equipment room. The tower part of the structure will house the elevator and exit stairway along with chase space for mechanical ducting and cable runs. The tower will contain contain an observation level, intermediate level containing a toilet, and the control tower cab. The tower shall have a SBS modified bitumen roofing system.

The existing GATR is to be removed and a new facility is to be built to replace it. The new building will be 60.3 square meters in size. The GATR building will receive radio signals and convert them to telephone signals. The building shall also house space for a radio repair shop with a work bench area for repair work, and a screen room 2,250 mm by 3,100 mm. The screen room shall be a RF shielded space that will be used for testing and calibration of equipment. The GATR building shall have a environmental or composting toilet. The building will be constructed of precast concrete wall panels with a SBS modified bitumen roofing system. The building shall not be heated. The building shall have a clear ceiling height of 2,500 mm minimum above the finish floor.

The layout of the mechanical, electrical and communication spaces are suggestive and may require wall configurations to be slightly altered to conform with equipment requirements.

Fire separation walls and egress from the facilities shall meet or exceed the requirements of NFPA 101 - Life Safety Code. See Section 01008 FIRE PROTECTION REQUIREMENTS. This facility shall have a dry pipe fire



sprinkler system which protects the entire building. The GATR building shall not be sprinklered.

## 1.2 DESIGN CRITERIA

The technical specifications provided shall serve as the minimum design standards established for this project. Design publications listed in each specification section shall be used as sources of criteria for design. The criteria from these sources may be supplemented, but not supplanted, by applicable criteria contained in nationally recognized codes, standards, and specifications.

### 1.2.1 TECHNICAL SPECIFICATIONS

Technical guide specifications for project development (See Section 01332 for information on usage and editing of UFGS specifications) shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product and installation requirements for this facility.

The UFGS specifications define the minimum requirements and level of quality for items of equipment, materials, installation, and testing that shall be provided for the facility. Where items of equipment, materials, installation, or testing requirements are not covered in the provided specifications; special sections or within each guide specification or new specifications sections shall be prepared to cover those subjects.

### 1.2.2 PUBLICATIONS

The design publications listed below shall be used as sources of criteria for the architectural design. The most current edition of any of the following codes or standards shall be used as criteria for the design. The criteria from these sources may be supplemented but not supplanted, by applicable criteria contained in nationally recognized codes, and standards.

#### 1.2.2.1 National Fire Protection Association

Life Safety Code #101

NFPA 80 Fire Doors and Windows, most current addition

#### 1.2.2.2 International Conference of Building Officials

Uniform Building Code

#### 1.2.2.3 Military Handbooks

MIL HDBK 1190 - Facility Planning and Design Guide,

Mil HDBK 1008C Fire Protection for Facilities

#### 1.2.2.4 American with Disabilities Act (ADA)

Uniform Federal Accessibility Standards, Fed-Std 795

#### 1.2.2.5 Occupational Safety and Health (O.S.H.A.) standards

#### 1.2.2.6 USAF Air Traffic Control Tower Design Guide, most current, for radar display, control tower glazing, window shades, control cab console, and

Brite Track requirements.

1.2.2.7 Academy Facilities Excellence Plan

1.2.2.8 Department of Defence Standards

Interim Department of Defence Anti-terrorism/Force Protection Construction Standards

1.2.2.9 USAF Academy Control Tower Charrette Minutes

1.3 DESIRED IMAGE AND ARCHITECTURAL COMPATIBILITY

The Proposer shall verify all existing conditions and dimensions during design and prior to construction.

The buildings shall fit the site and be compatible with the surrounding environment. Building facades and elevations shall be similar in appearance to the enclosed elevation drawings. The building is located near the existing sail plane hangar which is constructed in the International Style. The new control tower shall be constructed in the International Style to match the existing hangar, and meet the requirements of Academy Facilities Excellence Plan. The GATR building shall be located east of the control tower and shall also be designed in the International Style.

1.4 THE TYPE OF ACTIVITIES AND EQUIPMENT INVOLVED

The major functional activities of building are as follows:

The operations of the tower and support building are divided into three functional areas. There is a student area, and administration area, and the control tower function. The student area is accessed by a vestibule on the north side of the building. The north lobby provides access to the central building corridor. A large briefing room for student use shall be designed to have a "high tech" appearance with an exposed ceiling structure. Sub briefing rooms, break room, logger room, rope storage, toilets, and the cadet flight commander's office shall be accessible in the student side of the building. The administration side of the building shall house offices, a conference room, radio maintenance, electronics, telephone equipment, coffee bar, and toilets. The tower will include exit stairs, and an elevator which runs to an observation level, an elevator equipment room, and chase spaces. Above the observation level stairs access the cab used for air traffic operations. Mechanical, electrical and communications, spaces service the building, and tower.

1.5 TYPE AND METHOD OF CONSTRUCTION

1.5.1 Facility Construction

Facility shall be designed as permanent construction. The definition of permanent construction per MIL HDBK 1190: Buildings and facilities designed and constructed to serve a life expectancy of more than 25 years, and must have finishes, materials, and systems selected for low maintenance and low life-cycle cost.

Types and methods of construction limited to the criteria established herein and shall meet all governing codes.

Wood construction shall not be permitted.

Any concrete masonry units and/or concrete walls used in this buildings shall be developed on a standard masonry metric module. Metric standardization of masonry wall design shall be developed which result in as few cut blocks as possible. Masonry structural properties shall comply with requirements outlined in Section 01005 STRUCTURAL REQUIREMENTS.

Walls, windows, floors, and roofing systems shall be permanently constructed and attached to each other. All construction shall be done in a workman like manner, properly installed and finished. Vapor and moisture resistant membranes shall be continuous.

Methods, materials, systems, etc. shall be of a quality that requires little or no maintenance.

#### 1.5.2 Exterior Walls and Finish Materials

Exterior walls and finish materials of the control tower shall be selected on the basis of architectural compatibility and appearance in accordance with the design provided. The exterior skin of the lower part of the facility shall match that of the Sail Plane Hangar. The entire facility shall be built in the International Style. Exterior walls shall have a minimum "U" Value of .07 based on aged insulation values for the entire exterior wall construction. The tower structural system can be steel or concrete covered with a insulated pre-finished metal panel system.

The exterior walls of the GATR building shall be insulated pre-cast concrete, with a gypsum board interior finish. Exterior walls shall have a minimum "U" Value of .07 based on aged insulation values for the entire exterior wall construction.

#### 1.5.3 Interior Wall Construction

All interior walls shall be permanent construction.

Gypsum wallboard shall not be less than 16 mm thick.

Steel studs shall be sized according to the wall heights required.

Interior walls requiring fire ratings or other walls extending to the underside of the roof structure or floor structure above shall be designed and constructed in accordance with UL and approved tested systems. Walls extending to the roof shall have provisions for structural deflection of the roof structure above.

All interior mechanical, electrical or communications rooms walls shall be full height, running to the underside of the structure.

#### 1.5.4 Interior Wall Finishes

Interior wall finishes shall be high quality, low maintenance finishes suitable for the environment of this building. A level 5 finish is required on walls with a semi-glass paint finish.

All areas generally shall receive a painted finish except as described herein.

Toilet rooms and lavatory areas shall receive a ceramic tile wainscot of a minimum 1200mm above the finish floor with painted gypsum board above the

level of the wainscot. Full height ceramic tile shall be provided behind all toilet fixtures. A tile pattern or accent along the top of the wainscot shall be provided, accent color shall be per color board. The walls shall be set using a Dry-Set mortar method in accordance with the Tile Council of America.

Office areas and corridors shall be covered with vinyl wall covering.

See paint paragraph for painting systems requirements.

Walls with ceramic tile finishes on steel stud partitions shall have glass mesh mortar units, or concrete backer board as a substrate for tile.

#### 1.5.5 Floors

All interior floors of the single story area of the facility shall be concrete slabs on grade, and those floors shall be built over capillary water barrier that is over a vapor barrier. Floors of the tower shall be concrete filled metal pans supported by a steel frame structure or poured-in-place concrete structure at the Contractor's option.

Depressed floor slabs and mortar bed method shall be used for all floors that will receive ceramic tile in accordance with Tile Council of America (TCA) methods.

#### 1.5.6 Floor Finishes

Flooring for this facility shall consist of the following finishes:

The floor of the north student entrance vestibule and lobby shall be covered in terrazzo, and shall have a graphic of a flying sail plane embedded in the lobby floor. The floor of the south administration vestibule shall be covered in terrazzo without a pattern.

Ceramic floor tile installed in on-grade toilet rooms and shall be set using a cement mortar bed. Ceramic floor tile installed in the above grade toilet room shall be set using a dry-set method. Ceramic tile floors in toilet rooms shall be level except in the immediate areas around floor drains which shall be sloped. Shower areas shall have the floor slope to allow moisture to migrate to floor drains.

Vestibules shall have a recessed vinyl floor mats with centered in the space.

Carpeting shall be used in office areas.

Static dissipative carpeting shall be provided in the tower observation level and cab, see Section 01004 Interior Design Requirements for additional information.

The mechanical, electrical, communications, areas shall have exposed concrete slabs and shall be cleaned and sealed with a concrete hardener for durability and minimization of dust.

#### 1.5.7 Ceiling Finishes

Painted textured gypsum board ceilings shall be provided in toilet areas, and janitor closets.

Acoustical tile ceiling panels shall be at least 19 mm thick mineral fiber installed in rooms indicated below. The standard ceiling tile used at the USAF Academy is 600 mm by 600 mm Armstrong Cirrus Tegular. The new ceilings shall be similar or equal to the USAF Academy standard.

Rooms that have an exposed structure will require painting of the exposed structure, such as Briefing Room #105, mechanical, electrical, and communications rooms as listed below. Hanging acoustical panels will be required in the Briefing Room to reduce the air borne flutter echo and sound transmission within the room.

#### 1.5.7.1 Ceiling Height

The allowable clearance for finished ceilings in offices and other spaces shall be 2,700 mm above the finish flooring.

#### 1.5.8 Screen Wall Design

Screen walls enclosing mechanical and electrical equipment, or trash dumpsters that are located within the 24,000 mm standoff distance as defined by the Force Protection Criteria shall have a locking gate and top closure to prevent the placement of a bomb within the screen wall enclosure. The top closure shall be constructed of galvanized metal grating supported by steel angles. Sections shall be welded or padlocked to prevent removal. Sufficient removable panels shall be supplied to allow the removal of equipment. Tops of the screen walls shall be provided with a integral color precast concrete cap stone, and the total design shall be in keeping with the International Style.

### 1.6 FUNCTIONAL REQUIREMENTS

#### 1.6.1 Equipment and Furnishings

##### 1.6.1.1 Contractor Furnished and Contractor Installed Equipment

Contractor Furnished and Contractor Installed equipment within this facility shall include but not be limited to the following items:

- Elevator and elevator equipment
- Interior and exterior signage
- Toilet accessories
- Floor mats
- Motor operated projection screens and ceiling mounted projector mounts
- Fire extinguisher cabinets with fire extinguishers sized to fit into cabinet
- Casework and shelving, including cadet cubbies and parachute cubbies
- Personnel doors (Standard, fire rated, and insulated)
- Mop sinks
- Electric water coolers
- Sink and toilet fixtures
- Drapery with power operated system to open and close
- Roof hatch and disappearing stairs
- Antenna ring on roof
- Marker boards Briefing #105, Conference #113, & Sub Briefing #131 & 132. There shall be two marker boards in Briefing #105, one 8 meter minimum long board on the east wall, and one 4 meter minimum board on the south

wall. In Conference Room #113 one 3 meter minimum board shall be located on the east wall. Sub Briefing #131 & 132 shall have two 1.2 meter in each room. Marker boards shall be a minimum of 1,200 mm high, mounted 900 mm above the floor.

Control tower cab casework

#### 1.6.2 Occupational Safety and Health

Building design shall comply with OSHA Occupational Safety and Health Standards criteria.

#### 1.6.3 Handicapped Accessibility

The building shall comply with handicap accessibility requirements as outlined in the American With Disabilities Act (ADA) Uniform Federal Accessibility Standards Fed-Std 795 with the exception of the control tower cab which will be manned by able bodied staff. Handicapped personnel will be limited to the height of the observation level, the last stop of the elevator.

#### 1.6.4 Sound and Vibration Control

Standard materials and installation procedures shall be incorporated into the facility that reduce sound and vibration. When constructing walls, floors, ceilings, and roofs, materials shall be selected that will impede transmission of equipment vibrations and noise between rooms and within rooms. All interior walls shall extend up to the underside of structure, to limit sound transmission from one space to another.

#### 1.6.5 Physical Security

Conventional security measures, such as: locking door hardware, shall be incorporated into the facility design and development. The facility shall be designed to meet the criteria established in Force Protection Construction Standards. See specific paragraphs in this section for additional security criteria.

#### 1.6.6 Composition of Masses and Spaces and Architectural Details to Reflect the Desired Image, and the Scale and Nature of the Activities Involved

Features of scale such as joint lines in panels, and changes in texture shall be used to tie the building together with the ground line. Materials selected shall be compatible with the International Style of construction. Building elevations shall comply with the requirements of Facilities Excellence Plan, and shall be approved by the Base.

#### 1.6.7 Economy of Building Construction, Operation, and Maintenance: Life-Cycle Cost Effectiveness

##### 1.6.7.1 Economy

All materials shall be readily available within the local area, as shall sufficient trades to construct the building.

Generally skilled workers within the area shall be familiar with the proper methods required to build this facility.

The use of special skilled construction workers will be allowed to construct the tower structure and glazing of the observation level and control tower cab. The use of other special skilled workers and processes

shall be limited in this design where possible to reduce costs and increase efficiency.

#### 1.6.7.2 Operations and Maintenance

Material selections shall be based upon reducing operation and maintenance costs. All materials shall be easy to clean and resist soiling.

### 1.7 TECHNICAL REQUIREMENTS

#### 1.7.1 Miscellaneous Metals

##### 1.7.1.1 Access Doors and Panels

Access doors and panels shall be flush type. Frames for access doors shall be fabricated of not lighter than 1.52 mm (16 gauge) steel with welded joints and finished with anchorage for securing into construction. Access doors shall be a minimum of 350 mm by 500 mm and of not lighter than 1.89 (14 gauge) steel, with stiffened edges, complete with attachments. Access doors shall be hinged to frame and provided with a flush face and a keyed operated latch. Exposed metal surfaces shall have a shop applied prime coat. Finished paint coat shall match surrounding surfaces. Panel shall be installed in uninhabitable rooms (i.e., closets) and/or non-conspicuous locations.

##### 1.7.1.1 Louvers, Dampers, and Ductwork

Detailing and construction of louvers, motorized dampers, and ductwork shall be coordinated. Louvers shall be installed high on the wall to meet the criteria established by Force Protection Construction Standards.

#### 1.7.2 Roof Insulation

Roofing insulation shall be a polyisocyanurate type. A minimum aged "R" value of the roofing insulation shall be R-33, based upon a R-5.56 per 25 mm of thickness.

A single ply vapor barrier shall be installed between the roofing deck and the bottom of the roofing insulation, and installed in accordance with the guide specifications. The thickness of the vapor barrier shall be as required in the guide specifications.

#### 1.7.3 Roof Design

The control tower facility shall be covered with a styrene butadiene styrene (SBS) modified bitumen roof system. The critical aspects of the roofing system shall be performance, and minimal maintenance.

The GATR building shall be covered with a styrene butadiene styrene (SBS) modified bitumen roof system.

Roof slopes shall be at a minimum of 3 mm per 300 mm to drains. Primary roof slope shall be accomplished by sloping the structural roof framing members.

Roof system shall provide a 20 year minimum warranty.

Lightning protection shall be fully integrated and coordinated with the roofing detailing, and installation to not jeopardize in any way the roof

warranties.

#### 1.7.4 Sheet Metalwork, General

Contractor shall include a quality assurance plan which includes a checklist of points to be observed, prior to start of roofing work.

All interior cavity thru-wall flashing shall be a metal type. A non-metal elastomeric ply sheeting is acceptable.

Fascia shall have "V" crimps and a stable substrate as required to prevent "oil-canning" effect.

#### 1.7.5 Doors

a. Exterior hollow metal doors shall be heavy duty flush steel type of doors minimum of 1.52 mm (16 gauge) face sheets with 16 gauge pressed steel frames, shall be weather-tight, and insulated to meet an R-value of 10. Aluminum doors and glass panels shall be designed as part of the window wall system. Aluminum door frames shall have a thermal break to prevent temperature transferring from the exterior to the interior. Vertical stiles, and top rails shall measure 88 mm with the bottom rail measuring 163 mm. Aluminum door finish shall match the window finish. These doors shall be complete door and frame assemblies with weatherstripping, door bottoms, and thresholds.

b. All exterior doors shall open on to a concrete sidewalk or structural concrete landing or stoop and shall conform to NFPA #101 for floor slope at the door.

c. The exterior door to the tower stair shall be locked and alarmed at all times. All other exterior doors shall be open during the day time hours and locked and alarmed at night and have an exterior light centered above the door to meet Force Protection Construction Standards criteria.

d. Doors in fire rated walls shall be fire rated according to the fire rating requirements of the walls in which they occur. All fire doors shall be in accordance with the requirements of NFPA Life Safety Code #101 and NFPA 80, the most current edition.

e. Vestibule and lobby doors shall be incorporated into a window wall system as indicated on the elevations.

f. Interior doors shall be constructed of solid core wood consisting of premium grade birch set in pressed steel frames. Fire rated doors shall be hollow metal and rated according to the fire rating requirements of the walls in which they occur. All fire doors shall be in accordance with the requirements of NFPA 80.

g. Elevator door shall be stainless steel. The wall containing the control buttons shall be stainless steel.

#### 1.7.6 Hardware; Builder's (General Purpose)

##### 1.7.6.1 Hinges

All hinges shall be grade I with a minimum of 3 hinges per door for a single type door. Hinges shall be fully recessed and fit flush within designated frame slots. All exterior door hinges shall have non-removable



pins.

#### 1.7.6.2 Locks and Latchsets

All exterior and interior door locks and latchsets shall be series 1000 mortised type. All locks and keys shall be compatible with the existing USAF Academy keying system.

#### 1.7.6.3 Lock Cylinders

Lock cylinders shall not be less than seven pins.

Cylinder shall have key removable type cores. Disassembly of levers and locksets shall not be required to remove core from lockset.

Provide a minimum of 3 spare cores, 2 blank master key sets and 10 blank keys.

#### 1.7.6.4 Lock Trim

The doors of this facility shall have lever handles. All exterior doors shall be equipped with panic hardware devices.

#### 1.7.7 Keying

Locks and special key hardware shall be keyed to the USAF Academy Base master key system or equal compatible lock system with interchangeable cores.

A grand master keying system shall be provided for the building. All of the keys shall be keyed in one series, except the mechanical, electrical and communication equipment rooms. There shall be 3 grand master keys provided as part of the contract.

Locks for all mechanical, electrical, and communications equipment rooms shall be keyed to the existing Base utility keying system.

#### 1.7.8 Door Closing Devices

Surface type overhead door closures shall be Grade 1, Series CO2000 Full Cover. Closures shall be size VI.

#### 1.7.9 Auxiliary Hardware

Door floor stop and holder shall be Type L01371.

Door wall stops shall be Type L02251.

Lever extension flush bolts shall be type L04081.

Metal thresholds shall be Type J16130.

All exterior doors shall have aluminum housed type weather seals.

All rated doors shall have compression type seal gasketing.

#### 1.7.10 Finishes

Door hardware finish shall match satin stainless steel Type 630.

#### 1.7.11 Door Hardware

##### 1.7.11.1 Hardware Requirements

Door hardware in fire rated walls shall comply with NFPA and other applicable criteria.

##### 1.7.11.2 Hardware Sets

The following hardware sets listed are the minimum functional hardware requirements for each door type. Additional hardware may be required for each door type than listed below.

###### a. Exterior Steel Doors

(1) All single exterior personnel doors that is exposed to the elements shall have the following hardware features:

Grade 1 Hinges with non-removable pins

Exit Device Type 3, Mortise Device  
Overhead Closer  
Wall or Floor stops  
Weatherstripping  
Rain Drips  
Threshold

(2) All single exterior personnel doors that is not exposed to the elements (such a doors under a roof canopy) shall have the following hardware features:

Grade 1 Hinges with non-removable pins

Exit Device Type 3, Mortise Device  
Overhead Closer  
Wall or Floor stops  
kick Plate  
Weatherstripping  
Threshold

(3) All double exterior personnel doors shall have the following hardware features:

Grade 1 Hinges with non-removable pins  
Surface Vertical Rod Exit Devices  
Overhead Closer (Both leafs)  
Wall or Floor stops  
Kick Plate  
Weatherstripping  
Rain Drips  
Threshold

(4) All double exterior mechanical, electrical, generator, and communications room doors shall have the following hardware features:

Grade 1 Hinges with non-removable pins  
Mortise Lockset Hardware (Key locking capabilities on active leaf)  
Overhead Closer (Active leaf)

Lever Extension Flush Bolts (Inactive leaf)  
Kick Plates  
Weatherstripping  
Thresholds

b. Interior Doors

(1) All single doors used in offices, janitor's closets, storage rooms, shall have the following hardware features:

Grade 1 Hinges  
Mortise Lockset (Key locking capabilities - avoid self locking hardware.)  
Overhead Closer  
Wall Stops (Provide holder where appropriate)  
Kick Plate

(2) Single occupancy toilets shall have the following hardware features:

Grade 1 Hinges  
Mortise Privacy Lockset  
Overhead Closer  
Wall Stops  
Kick Plate

(3) All single doors in multiple occupancy toilet rooms shall have the following hardware features:

Grade 1 Hinges  
Push Plate  
Pull Plate  
Overhead Closer  
Wall Stops  
Kick Plate

(4) Door to Control Tower Cab shall have the following hardware features:

Grade 1 Hinges with non-removable pins, provide electric hinge to supply power for an electric strike  
Electronic Keypad  
Electric Strike activated by keypad or buzzer located in Control Cab  
Overhead Closer  
Wall Stop  
Kick Plate

The door shall have a ceiling mounted television camera wired to the control cab to monitor personnel accessing the door. An intercom system shall be provided to address personnel from the control cab.

1.7.12 Key Storage System

A recessed wall mounted key cabinet shall be provided in Office #110, and contain all additional keys for all areas of the building. Cabinet shall have the capacity to store a minimum of two keys for each room on an individual key hook. Key hooks shall be mounted on panels with sufficient distance between hooks that will allow easy identification and removal. Cabinet key panels shall be readily removable and capable to insert additional panels for expansion needs. Key cabinet shall have key locking capabilities. Cabinet door shall be a full height piano hinge.

#### 1.7.13 Knox Box

The contractor shall provide a wall mounted single Knox Box, used to house a building key for fire department use. The location of the Knox Box shall be outside Vestibule #101 in a location approved by the Fire Department. The Knox Box shall be a #3200 series from The Knox Company, color shall be black, size shall be 125 mm X 100 mm X 75 mm. The box is be keyed to USAF Academy Fire Department access keying system. A grand master key to the building shall be provided within the Knox Box.

#### 1.7.14 Graphic Annunciator Panel

In Vestibule #101 provide a graphic annunciator panel. The panel shall have a graphic plan of the building with indicator lights defining the areas with activated fire alarms.

#### 1.7.15 Windows

Window manufacturer of standard windows shall specialize in designing and manufacturing the type of aluminum windows specified in this section, and shall have a minimum of 10 years of documented successful experience. Exposed surfaces of aluminum windows shall be finished with anodic coating conforming to AA DAF-45: Architectural Class I, AA-M10-C22-A44, color anodic coating, 0.7 mil or thicker.

Windows construction shall consist of an aluminum frame with a continuous thermal break. Performance rating of these windows shall be a HC 65 or greater in accordance with performance rating testing with AAMA 101. These windows shall include insulated glazing unit as specified in Section 08810 GLASS AND GLAZING. Window frames shall have a color anodized finish.

Provide a solid surface material window stool at all window sills except those windows or curtain walls which run to the floor level. Exposed gypsum board window stools are not permitted.

#### 1.7.16 Control Tower Glazing

The control tower windows shall comply with FAA Order #6480.7c and Attachment #1 of the USAF Air Traffic Control Tower Design Guide. Window shall be double glazed units conforming to ASTM C 1036-85. Window units shall consist of two panes of glass separated by a 13 mm air space. the outer pane shall be Type 1, Class II, Quality q3, slightly blue /green, the interior pane shall be Type 1, Class 1, Quality q3, clear. Consideration shall be given to new products such as "Starfire" glazing, however the products shall be thoroughly evaluated before there inclusion into the design to assure their proper application.

Control room shades shall meet FAA Order #6480.18, FAA Standard Specification for Transparent Plastic Window Shades for Use in Airport Control Towers, dated 3 April 1986.

Window sills of the cab shall be a solid surface material matching the color of the control tower consoles. Sills shall be strong enough for window washers to stand on the sill during window cleaning. Sill material selected shall be of a color or finish that does not allow glare to enter into the control cab.

#### 1.7.17 Other Glass and Glazing

#### 1.7.17.1 Insulated Laminated Glass

Insulated laminated type glass for door applications shall be a minimum of 25 mm thick. Glass panel shall consist of two-6 mm glass panes separated by a 13 mm air space and hermetically sealed. Glass shall be Type I annealed glass, Class 1- clear, Quality q3- glazing select. All insulated glazing units shall be tinted with the reflective coating applied to the number two surface.

#### 1.7.17.2 Glass Mirrors

All glass mirrors shall be Type I transparent flat type, Class 1-clear and 6.4 mm thickness.

#### 1.7.17.3 Laminated Glass

Laminated glass shall be Class 1 - clear, Condition A uncoated surface, Quality q3- glazing select. Laminate glass shall consist of two layers of Type I transparent heat strengthen glass bonded together with a PVB plastic inter layer.

#### 1.7.18 Gypsum Wallboard

Manufacturer shall have specialized in the manufacturing of these material products for a minimum of 10 years of documented experience.

Installer shall have a minimum of 5 years of documented experience.

All gypsum wall board shall be a minimum of 16 mm thick.

Gypsum board in corridors, lobbies, break room, and other areas subject to abuse shall be constructed with impact resistant gypsum board.

All metal studs shall be placed at a maximum distance 400 mm on-center.

Predecorated gypsum board is not acceptable.

Exterior gypsum soffit board is not acceptable.

Water-resistant gypsum backing board used as a substrate to receive ceramic tile is not acceptable.

#### 1.7.19 Tile

Floor tile in toilets shall be installed in accordance with Tile Council of America (TCA) method F121.

Wall tile in toilets areas shall be installed in accordance with Tile Council of America (TCA) method W244.

#### 1.7.20 Ceilings

##### 1.7.20.1 Gypsum Board Ceiling

All gypsum board ceilings shall have a light textured finish.

##### 1.7.20.2 Acoustical Tile Ceiling

Acoustical ceiling system shall be a 600 mm x 600 mm exposed grid type.

Acoustical panels shall have a square edge and recessed where the exposed grid system supports the panels. Characteristics of the acoustical panels shall consist of: textured surface, high density material to resist impact damage, non-perforated tile with a textured finish.

#### 1.7.21 Painting, General

##### 1.7.21.1 Surfaces to Receive Stain or Paint

A semi-gloss enamel paint shall be on all exposed wall surfaces. A washable high-gloss enamel paint shall be used on all toilet, and janitor closet walls.

All gypsum board ceilings shall receive a flat latex paint finish.

Steel roof deck, structural elements, shall receive a semi-gloss paint finish.

##### 1.7.21.2 Surfaces Not to be Painted

Surfaces in the following areas are not to be painted:

Concrete or concrete masonry units in unexposed areas.

Concrete and concrete masonry units surfaces in mechanical, electrical and communication rooms.

Concrete floors - except where noted.

Metal surfaces of aluminum, stainless steel, chromium plate, bronze, copper and similar finish materials.

Jacketing over pipe insulation in unexposed locations that do not require color coding.

Surfaces of hardware, fittings, sprinkler heads, fire protection equipment and other factory finished items not requiring a painted finish.

Glass, wall coverings and other finish surfaces.

#### 1.7.22 Exterior Signage

Building number signage shall be cast aluminum material in a helvetica medium style, located on the south and southeast corners of the building. Building number signage shall be eight inches tall, satin-finished brushed aluminum, and mounted 1,500 mm above the finish floor.

#### 1.7.23 Toilet Accessories

##### 1.7.23.1 Accessory Types

Toilet partitions shall be constructed of stainless steel sheets. Toilet partitions shall be ceiling hung.

Paper Towel Dispenser/ Waste Receptacle (PTDWR) shall be a recessed unit supplying multi-fold paper towels. The cabinet shall have a concealed tumbler key lock. Unit shall have a 37.85 L minimum removable molded plastic insert.

Soap Dispenser (SD) shall be the liquid type pump type with a minimum 34 fluid ounce capacity. Dispenser shall be mounted on the wall above the lavatory fixture.

Mirror Glass (MG) mirrors shall be a minimum of 450 mm wide by 750 mm high and one mirror shall be installed over each lavatory in toilet rooms.

Toilet Tissue Dispenser (TTD) shall be a double roll dispenser with a recessed holder.

#### 1.7.23.2 Toilet Accessory Finishes

Finishes shall match stainless steel, Type 304.

#### 1.7.24 Fire Extinguisher Cabinets

Fire extinguisher cabinets shall be fully recessed type with a flat metal door. Clear plastic bubble type door fronts is not acceptable. Fire extinguisher cabinets shall be located in accordance with NFPA #10. Color of the cabinets shall match that of the wall. Fire extinguisher cabinets shall be non-locking, equipped with a side mounted piano hinge, and an adjustable roller friction catch. The cabinet shall contain a 10lb ABC type fire extinguisher. The cabinet shall have the words "FIRE EXTINGUISHER" on the outside of the cabinet.

#### 1.7.25 Janitor's Closet Accessories

Each janitor's closet shall have a broom/ mop rack.

The janitor closet shall have a 1.21 mm (18 gauge) stainless steel satin finish shelf with 4 integral mop holders and 5 hook brackets.

#### 1.7.26 Elevator

An hydraulic elevator shall run from the ground floor to the observation deck of the tower, the elevator shall have 4 stops in the length of the run to service cable and DBRS equipment located on intermediate levels. The elevator shall have a rated load capacity of 907 kg (2000 lbs), with a passenger capacity of 12, and a speed of 37.5 meters per minute (125 feet per minute). Interior of the elevator cab shall have a carpeted floor and plastic laminate finish walls. The elevator shall come complete with controls and grab rails in a stainless steel finish, telephone, ADA signage, and controls. Emergency control back-up shall be provided.

### 1.8 Room Descriptions

#### 1.8.1 Entrance Vestibule #101

A recessed floor mat shall be set in the center of the vestibule. The north and south walls shall be constructed of glass glazing set in a metal frame. Insulated glass shall meet the requirements of Force Protection Construction Standards and meet energy efficient coefficient established in this section. The graphic annunciator panel shall be located inside the vestibule, and a Knox Box shall be located outside the vestibule.

#### 1.8.2 Lobby #102

The space shall have a higher ceiling than the surrounding areas, with gypsum board ceiling and light soffit. The floor shall be covered

with terrazzo floor tile. A pattern image of a sailplane in flight shall be provided in the lobby the design shall occupy an area of 1800 mm in diameter, the design to be submitted to the USAF Academy for approval prior to installation. Walls shall be covered with vinyl wall covering. The sailplane graphic shall be located so that the design is not covered by any furniture installed in the space. Walls of the lobby shall have a minimum STC rating of 50.

1.8.3 Corridor #103

Ceilings shall be acoustical tile. The floor shall be carpeted, and the walls shall be painted. Walls of the corridor shall have a minimum STC rating of 50.

1.8.4 Lobby #104

Ceilings shall be acoustical tile. The floor shall be carpeted, and the walls covered with vinyl wall covering.

1.8.5 Briefing Room #105

The room is to have a "high tech" in appearance. The room is to have an exposed structural ceiling with hanging acoustical panels in the ceiling space to reduce flutter echo in the room. The floor finish shall be carpet, and the walls painted. Provide a motorized projection screen, and a audio visual equipment mount to hold a color projector. A chair rail shall be provided on all four walls of the room. The room shall be designed to house 50 students and 10 instructors. Walls of the briefing room shall have a minimum STC rating of 50.

1.8.6 Electrical Room #106

Exposed painted structural ceiling with sealed concrete floor. Walls shall be painted. Walls of the electrical room shall have an STC of 50.

1.8.7 Supply Room #107

Acoustical tile ceiling with carpeted floor, and painted walls. Storage shelves to be located on the north wall.

1.8.8 Offices #109 and 110

Acoustical tile ceiling with carpeted floors, and vinyl wall covering on all walls. Walls of the offices shall have a minimum STC of 45.

1.8.9 Storage #111

Built-in wood shelving shall be provided along the north wall. Acoustical tile ceiling with carpeted floor, and painted walls.

1.8.10 Conference Room #113

Acoustical tile ceiling with carpeted floors, with vinyl wall covering on all walls. Provide a recessed motorized ceiling mounted projection screen, and recessed motorized audio visual equipment mount to hold a color projector. A chair rail shall be provided on all four walls of the room. Walls of the conference room shall have a minimum STC of 50.



1.8.11 Office #114

Acoustical tile ceiling and carpeted floor, with painted walls. The room shall be designed to hold 6 work stations. The wall between the mechanical room and this office shall have an STC of 50. The exterior wall shall have a minimum STC of 50.

A coffee bar shall be provided within the room, the counter shall have a solid surface material counter top with plastic laminate covered base cabinet and above counter storage cabinets. The base cabinet counter shall be 900 mm above the floor. The above counter storage cabinets shall have doors. All doors and drawers shall have locks. Provide a stainless steel bar sink with a goose neck faucet in the counter.

1.8.12 Mechanical Room #115

Exposed painted structural ceiling with sealed concrete floor. Walls shall be painted. Walls of the mechanical room shall have an STC of 50.

1.8.13 Toilets #116 and 117

Provide full mortar bed ceramic tile floor. Provide full height ceramic tile on the fixture wall and a ceramic tile wainscot on all other walls. Provide a paper towel/ waste receptacle in each toilet. Provide a pattern band or other design on all walls. Provide toilet fixtures and grab bars. Provide one 450 mm by 650 mm mirror above the lavatory. Ceilings shall be moisture resistant gypsum board with textured finish. Walls of the toilet shall have a minimum STC of 40, with the exception the wall between the mechanical room and the toilets shall be STC 50.

1.8.14 Elevator Equipment Room #118

Floor to be sealed concrete, with a pit or elevated lip to contain all the hydraulic fluids used in the elevator equipment. The space above the room will become a chase space. Wall around the equipment room shall have a minimum STC of 50.

1.8.15 Elevator Lobby #119

Gypsum board ceiling with textured finish and carpeted floor, with painted walls.

1.8.16 Stairs #120

Painted walls with raised square rubber flooring between Observation floor and the Control Cab. Stair runs below the Observation floor shall have unfinished concrete filled metal pan stair treads. Provide continuous rubber stringer to match the rubber flooring, stepped stringers shall not be permitted. The stair tower shall be heated, but not air conditioned.

1.8.17 Electronics #121

Acoustical tile ceiling with static dissipative tile floor, and painted walls.

1.8.18 Telephone Equipment #122

Acoustical tile ceiling with static dissipative tile floor, and painted walls.

1.8.19 Radio Maintenance #123

Acoustical tile ceiling with static dissipative carpet, and painted walls. The room shall be designed to hold a minimum of 5 work stations.

1.8.20 Offices #124 and 125

Acoustical tile ceiling with carpeted floor, and painted walls. Walls of the offices shall have an minimum STC of 45.

1.8.21 Cadet Flight Commander #126

Acoustical tile ceiling with carpeted floors, and vinyl wall covering on all walls. Walls of the office shall have a minimum STC of 45.

1.8.22 Toilets #127 and 129

Provide full mortar bed ceramic tile floor. Provide full height ceramic tile at fixture wall and wainscot at all other walls. Provide a patterned band or other design on all walls. Provide handicapped grab bars. Ceilings shall be moisture resistant gypsum board with textured finish. Provide both paper towel dispenser/ waste receptacle in each toilet. Provide sanitary napkin dispenser and disposer in the women's toilet. Provide at minimum one 450 mm by 650 mm mirror above each lavatory. Provide one full length mirror in each toilet in addition to the mirrors located above the lavatories. Provide robe hooks on each toilet partition door. The break down of males to females is 60% to 40%. Walls of the toilets shall have a minimum STC of 40.

1.8.23 Janitor's Closet #128

Provide full mortar bed ceramic tile floor. Provide full height ceramic tile on all walls. Provide floor mounted mop sink with wall mounted shelf and 3 position mop hooks above the mop sink.

1.8.24 Corridor #130

The space shall have a higher ceiling than the surrounding areas, with gypsum board ceiling and light soffit. The floor shall be covered with terrazzo floor tile. Walls shall be vinyl wall covering.

1.8.25 Sub Briefing #131 and 132

Acoustical tile ceiling with carpeted floors, and vinyl wall covering on all walls. A chair rail shall be provided on all four walls of the room. Walls of the briefing rooms shall be a minimum STC of 50.

1.8.26 Break Room #133

Acoustical tile ceiling, vinyl composition tile floor, with painted walls. Walls of the briefing rooms shall be a minimum STC of 50.

Cubbies shall be provided in the room for the storage of cadet backpacks. The cubbies shall be constructed of wood, and shall measure 300 mm wide by 300 mm high by 600 mm deep, and shall be finish painted or stained. A counter with solid surface counter top with plastic laminate covered base cabinet and above the counter cabinet unit. The above the counter cabinet units shall have doors. The base cabinet counter shall be 900 mm above the

floor. The counter shall have a stainless steel two compartment sink. All doors and drawers shall have a key lock. Two electric water coolers shall be provided within the room.

1.8.27 Logger Room #134

Acoustical tile ceiling, vinyl composition tile floor, with painted walls. The room shall hold a minimum of 4 people, with a counter located on the west wall of the room. Counter height shall be 665 mm above the finished floor.

1.8.28 Rope Storage #135

Acoustical tile ceiling, vinyl composition tile floor, with painted walls. Wood cubbies for parachute storage shall be provided.

1.8.29 Landing #201, 301

Painted exposed structural ceiling, unpainted concrete floor and painted walls.

1.8.30 Observation #401

Acoustical tile ceiling, carpeted floor and painted walls. Provide key pad controlled electronic lock, electric strike and security camera at the stairway door to the control cab. The door shall be opened by the keypad, or electric strike from the control cab level. Electric operated drapes shall be provided to close the windows. Provide a recessed motorized ceiling mounted projection screen, and recessed motorized audio visual equipment mount to hold a color projector. A chair rail shall be provided on all four walls of the room.

1.8.31 Elevator Lobby #402

Acoustical tile ceiling, carpeted floor and painted walls.

1.8.32 Toilet #501

Provide ceramic tile floor set dryset method. Provide full height ceramic tile on the fixture wall, and a ceramic tile wainscot on all walls. Ceilings shall be moisture resistant gypsum board with textured finish. Provide a single mirror above the lavatory.

1.8.33 Control Cab

Acoustical tile ceiling, painted black to reduce glare. Light fixture trim, sprinkler heads, ceiling grid, ceiling mounted fans, ceiling tiles, D Brite track and articulating arm system are to painted black, or have a black finish to reduce glare. A raised flooring system with carpet tiles shall be provided see Section 01004 INTERIOR DESIGN REQUIREMENTS. Carpet in the cab shall not be installed until after the EI Team and the contractor have completed there work. Consoles for control tower equipment shall have solid surface counter tops, with plastic laminate base cabinets. The cab consoles shall be divided into two operational areas, Glider 94th FTS (West Side) and Motorized aircraft (East Side), as indicated in drawings.

The control tower will only be operated during daylight hours. Operational lighting in the control cab shall be minimal.

Pull down plastic shades shall be provided in accordance with the USAF Air Traffic Control Tower Design Guide.

In the control cab a flight data board shall be provided. The contractor shall get flight data cards from the Base COR office.

Access to the roof from the control tab shall be by a disappearing stair located above the suspended ceiling system. The stair shall be a manually operated, and be in a double fold, triple fold or telescoping design.

Casework in the Control Cab shall be designed similar to Air Traffic Control Tower Wrap Around Console MCP Program drawings, and modified to match the floor plan indicated on the drawings. The design shall be used for casework profiles and construction detailing.

#### 1.9 Casework and Counter Tops

All casework construction shall meet the requirements of the National Kitchen Cabinet Association. Cabinets shall be provided as indicated on the drawings. Cabinets shall be standard or custom manufactured products. Frame type units shall be provided. Top and bottom corners shall be braced with either hardwood blocks that are glued together with water resistant glue and nailed in place, or metal or plastic corner braces. All casework shall be constructed of solid wood or five-ply plywood. All points of hardware attachment shall be inserted into solid wood lumber. The finish of all exposed cabinet surfaces, and door shall be covered by plastic laminate unless otherwise directed by parts of this document. Counter tops shall be solid surface material such as "Corian". The finish of the interior cabinets, shelving, and interior door surfaces shall be plastic laminate.

Drawers shall have side guides with automatic stop feature. Sides and bottom shall be constructed of hardwood or plywood. Drawer fronts shall be removable and replaceable. All drawers shall be dove-jointed.

All exposed edges shall be rounded.

All cabinet pulls shall be recessed, and meet the requirements of Americans with Disabilities Act. Doors shall have concealed hinges. Finishes shall match stainless steel, Type 304.

PART 2 NOT USED

PART 3 NOT USED

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SECTION 01004

INTERIOR DESIGN REQUIREMENTS

PART 1 INTERIOR DESIGN REQUIREMENTS

1.1 REFERENCES

The publications listed below shall be utilized for design of this facility to the extent referenced. The publications shall comply with the latest edition of the UFGS guide specification.

AIR FORCE GUIDANCE

AFCEE Design Guidance	Air Force Center of Environmental Excellence, Interior Design Presentation Format <a href="http://www.afcee.brooks.af.mil/dc/dcd/interior/intdespu.htm">http://www.afcee.brooks.af.mil/dc/dcd/interior/intdespu.htm</a>
AFPAM 32-1097	Air Force Sign Standards Pamphlet <a href="http://afpubs.hq.af.mil/pubs/majcom.asp?org=AF">http://afpubs.hq.af.mil/pubs/majcom.asp?org=AF</a> (click on Series 32)
Control Tower Design Guide	Air Traffic Control Tower Design Guide <a href="http://www.3di.com/sanantonio/atct1001/images/ATCT_RAPCON_Guide.pdf">http://www.3di.com/sanantonio/atct1001/images/ATCT_RAPCON_Guide.pdf</a>
USAFA Interior Guide	(Draft) United States Air Force Academy Interior Guidelines

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A137.1	Ceramic Tile
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AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

AATCC 134	Test Method: Electrostatic Propensity of Carpets
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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 109	Standard Test Method for Compressive Strength of Hydraulic Cement Mortars
ASTM C 423	Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
ASTM D 1335	Tuft Bind of Pile Floor Coverings Room Method
ASTM D 2047	Coefficient of Friction (James Machine)

ASTM E 648	Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
ASTM E 84	Surface Burning Characteristics of Building Materials
ASTM F 150	Standard Test Method for Electrical Resistance of Conductive Resilient Flooring Reinstated
ASTM F 510	Standard Test Method for Resistance to Abrasion of Resilient Floor Coverings Using an Abrader with a Grit Feed Method
ASTM F 793	Standard Classification of Wallcovering by Durability Characteristics
ASTM F 1066	Vinyl Composition Floor Tile
ASTM F 1344	Rubber Floor Tile

CODE OF FEDERAL REGULATIONS (CFR)

36 CFR 1191	Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities
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CODE OF FEDERAL REGULATIONS (CFR)

16 CFR 1630	Standard for the Surface Flammability of Carpet and Rugs
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FEDERAL SPECIFICATIONS (FS)

FS AA-V-00200	Venetian Blinds
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ELECTROSTATIC DISCHARGE ASSOCIATED STANDARD

ESD S7.1	Floor Materials - Resistive Characterization of Materials
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FEDERAL STANDARDS (FED-STD)

FED-STD 795	(Basic) Uniform Accessibility Standards (UFAS)
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NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 99	Health Care Facilities
NFPA 265	Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of

## Textile Wall Coverings

### UNIFORM BUILDING CODE (UBC)

UBC 8-2	Standard Test Method for Evaluating Room Fire Growth Contribution of Textile Wall Covering
UBC 42-2	Standard Test Method for Evaluating Room Fire Growth Contribution of Textile Wall Covering

## 1.2 DESIGN CRITERIA

The design of this building shall be in accordance with this document, Control Tower Design Guide and USAFA Interior Guide. Applicable USAFA Interior Guide criteria is provided in Attachment No.4 of the RFP, reference Support Area and General Area information.

## 1.3 INTERIOR FINISHES

### 1.3.1 Cab Carpet

Carpet for the cab shall be equal to Julie Industries Static Smart ESD Series (formerly known as UTP RTG) carpet tile. Carpet tile shall be field installed, not factory applied. Carpet shall be textured loop. Color, pattern and tile size shall be coordinated with the Contracting Officer. Minimum yarn weight for multi-color shall be 881 grams per square meter and heather shall be 949 grams per square meter. Fiber shall be soil and stain-hiding BASF Zeftron nylon. Carpet shall have a continuous conductive Helix 44 denier monofilament in every tuft. Electrical resistance shall be as tested in accordance with:

NFPA 99 RTT - 2.5 x 10 to the fourth ohms minimum, 1.0 x 10 to the sixth ohms maximum

NFPA 99 RTG - 2.5 x 10 to the fourth ohms minimum, 1.0 x 10 to the eighth ohms maximum.

Groundable path shall be a 5mm copper clamp or strip. Grounding frequency shall be 1 per 1,000 square meter. Backing system shall be dissipative PVC tile conductive additive. Carpet shall have a minimum average critical radiant flux of .45 watts per square centimeter when tested in accordance with ASTM E 648. Cab carpet shall be installed as recommended by the carpet manufacturer using manufacturer recommended adhesives.

### 1.3.2 All Other Carpet

Carpet shall be patterned or bold multi-colored tweed for maximum soil-hiding properties. A bold tweed must contain a minimum of five distinctly different colors (ex: gray, light blue, wine, black and navy). It shall be 100% continuous filament, solution dyed and/or yarn dyed, branded nylon with loop construction. Primary and secondary backing for broadloom carpet shall be synthetic. Carpet tile shall be located in room 114 Open Office. Carpet tile backing shall be those customarily used and accepted by the trade for carpet tile. All other areas, unless otherwise noted, shall have 1828 mm (6') wide broadloom carpet with attached pad. Carpet shall meet the following minimum requirements:

#### 1.3.2.1 Pile Type



Pile type shall be loop and a minimum 50.4 rows/10cm (1/13) gauge. Minimum yarn weight shall be 814 grams per square meter (24 ounces per square yard), and minimum pile density of 7000.

#### 1.3.2.2 Static Control

Static electricity build-up of the carpet shall be permanently less than 1.7 kilovolts for the broadloom carpet and 0.8 kilovolts for the carpet tile at 70 degrees F and 20 percent relative humidity as determined by the American Association of Textile Chemists and Colorists (AATCC 134 Test Method), Electrostatic Propensity of Carpets.

#### 1.3.2.3 Flammability and Critical Radiant Flux Requirements

Carpet tile and 6' wide broadloom carpet systems (carpet with attached pad) shall comply with 16 CFR 1630 and have a minimum average critical radiant flux of .45 watts per square centimeter when tested in accordance with ASTM E 648.

#### 1.3.2.4 Tuft Bind

Tuft bind force required to pull a tuft or loop free from carpet backing shall be a minimum 44 newton (10 pound) average force for loop pile when tested in accordance with ASTM D 1335. A ten year warranty from the carpet manufacturer against edge ravel, delamination and tuft bind is required.

#### 1.3.2.5 Installation

Carpet shall be installed with release adhesive or pre-applied tackifier. Adhesives and concrete primers shall be waterproof, nonflammable, meet local air-quality standards, and be as recommended by the carpet manufacturer.

#### 1.3.3 Vinyl Composition Tile

Vinyl composition tile shall conform to ASTM F 1066, Class 2 (through pattern tile), Composition 1, asbestos-free. Tile shall have the color and pattern uniformly distributed throughout the thickness of the tile.

#### 1.3.4 Static Dissipative Tile

Static dissipative flooring shall be 3 mm thick, 609 mm x 609 mm tile, and shall be homogeneous solid vinyl tile that has encapsulated conductive elements of the carbon family distributed throughout the tile. The flooring shall conform to ESD S7.1, and electrical resistance shall be as tested per ASTM F 150: point to ground - greater than  $2.5 \times 10$  to the fourth ohms.

#### 1.3.5 Rubber Flooring and Stair Treads

Rubber flooring and stair treads shall conform to ASTM F 1344 Class 1 homogeneous construction, Type A. Surface shall be raised square studs with chamfered edges. Stud profile shall be low, and overall thickness shall be 3 mm. A one piece tread/riser design is required, including stringer angles on both the wall and banister sides and landing trim. Base for the stair stringer shall be full height from the top of the tread to the top of the stringer channel.

#### 1.3.6 Ceramic Tile

Ceramic tile shall conform to ANSI A137.1, moderate to heavy grade only. Toilet floor and wall tile shall be 50 mm x 50 mm. Porcelain tile and trim shall be unglazed and unpolished with the color extending uniformly through the body of the tile. Porcelain tile shall be equal to Crossville Ceramics.

#### 1.3.7 Recessed Floor Mat

Provide recessed floor mats as indicated on drawings. Floor mat inserts shall be heavy duty colorfast, solution dyed nylon carpet with 12 mil monofilament.

#### 1.3.8 Terrazo Tile

Terrazo tile shall consist of marble chips embedded in a flexible thermoset polyester resin matrix. Tile shall be 4.75mm thick, and a nominal 300 x 300 mm square. Tiles shall have a smooth polished finish with uniform color distribution of chips. Marble chips shall be manufacturer's standard gradation. Flooring shall meet or exceed the following criteria: Compressive Test of 203 to 351 kilograms/centimeter squared in accordance with ASTM C 109, Coefficient of Friction of 0.70 to 0.74 average in accordance with ASTM D 2047, Class 1 as per ASTM 648, and Abrasive Wear of volume loss/cm cubed of 0.0196 in accordance with ASTM F510-93.

#### 1.3.9 Interior Signage

Interior signage is required and must be coordinated with the Contracting Officer. Signage must conform to 36 CFR 1191 Americans with Disabilities Act (ADA) and FED-STD 795 Uniform Federal Accessibility Standards (UFAS), whichever is most stringent. Signage shall be equal to System 2/90 sign system and comply with the USAFA Interior Guide Criteria. Provide signage for all rooms unless otherwise directed by the Contracting Officer. Coordinate signage requirements and placement with Contracting Officer. Building directories shall be provided at building entrances.

#### 1.3.10 Window Treatment

a. Vertical blind units shall be provided on exterior and interior windows with the exception of the tower cab. The vertical blinds shall be capable of nominally 180 degree partial tilting operation and full stackback. The blinds shall be listed by the manufacturer as designed for heavy duty strength applications including heavy duty hardware. Louvers shall be solid vinyl fire resistant, UV stable, impact resistant, and shall not emit corrosive fumes in a fire. Manufacturers standard valance shall be attached to the headrail by metal or plastic holders which grip the top and bottom edge of the valance and shall accept an insert of the same material as the louver. Valance is not required if window also has drapery.

b. Exterior windows of Briefing Room 105 shall also have drapery hardware. Drapery hardware for this room shall support drapery with black-out lining and shall be equal to Kirsch Accordia-Fold system two-way draw with baton draw, master carriers shall overlap and 100% fullness. Coordinate with CID drapery requirements. To the greatest extent possible, stackback shall be off the window.

c. Observation deck windows shall also have drapery hardware. Drapery hardware shall support drapery with black-out lining, have an electronic motor, and shall be operated by a wall switch. Hardware shall also be

operated by remote control. Coordinate with CID drapery requirements. Track shall be curved as required. Stackback shall be off the window.

d. Type of draw, two-way and one-way, shall be coordinated with the Contracting Officer.

#### 1.3.11 Vinyl Wallcovering

Vinyl Wallcovering shall be vinyl coated woven or nonwoven fabric with germicidal additives and shall conform to ASTM F 793 Category V, Type II. Vinyl wall covering shall have a Class A flame spread rating of 0-25 and smoke development rating of 0-50 when tested in accordance with ASTM E 84. Provide wallcovering that is aesthetically pleasing and has some visual texture to simplify maintenance. Wallcovering shall not be solid in color. Clear plastic corner guards are required on outside corners with vinyl wallcovering.

#### 1.3.12 Resilient Base

Resilient base shall be vinyl; straight style installed with carpet, coved style installed with resilient flooring. Base shall be 100 mm high and a minimum 3 mm thick. Job formed corners shall be furnished.

#### 1.3.13 Acoustical Wall Material

Acoustical wall material shall be a fusion bonded solution dyed polypropylene, polyester or polyester/nylon blend with a minimum total weight of .542 kg/square meter. NRC rating shall be a minimum of .15 when tested in accordance with ASTM C 423. The wall material and installation shall comply with UBC 42-2, UBC 8-2 or NFPA 265. Clear plastic corner guards are required on outside corners with acoustical wall material.

#### 1.3.14 Installation of Finishes

All finishes shall be installed as per manufacturer's recommendations. In addition, manufacturer's recommended equipment, adhesives and related items shall be used.

### 1.4 COLOR, TEXTURE, AND PATTERN

The color, texture, and pattern selections for the finishes of the buildings shall provide an aesthetically pleasing, comfortable, easily maintainable and functional environment for the occupants. Coordination of building colors and finishes is necessary for a cohesive design. Color of ceramic tile grout shall be a medium range color to help hide soiling. Plastic laminate shall have patterns that are mottled, flecked or speckled with a mar-resistant finish, such as Formica's "Crystal" finish. Solid surface material shall also have a pattern that is mottled, flecked or speckled, except for sinks and accent areas. Stained woodwork shall match throughout the facility. Use patterns and accent walls where appropriate to provide interest or focal points. Locations of accent walls shall be coordinated with the Contracting Officer. All ceiling surfaces in the cab shall be black in color, this includes but is not limited to the ceiling grid, tiles, light fixture frames, ceiling fans, sprinkler heads and any other items on the ceiling.

#### 1.4.1 Interior Finishes

Following is a listing of manufacturers colors that have been used to establish color direction for this facility. The manufacturers referenced are not intended to limit the selection of colors and patterns from other manufacturers, but are listed to identify the color theme. These colors and patterns shall be used as a guide when making selections for this project. Colors for finishes not identified shall be compatible and coordinate with the listed finish colors. Selection of finish colors shall be coordinated with the Contracting Officer.

**Carpet:** Collins and Aikman, Infinity, 55022 Moonstone

**Vinyl Base:** VPI, #36 Silver Sable

**Terrazzo Tile:**

Field - Fritz Tile, CL200 Series, Color: Aztec White CL210,  
Classic Flexible Marble Tile

Border - Fritz Tile, CL200 Series, Color: Raven Black CL221,  
Classic Flexible Marble Tile

Accent Colors - Fritz Tile, colors shall be coordinated with  
the Contracting Officer

**Wall Paint:** Pittsburgh, #2541 Abbey

**Trim:** Pittsburgh, #2752 Pussy Willow

**Ceramic Floor Tile:** DalTile, Keystone Mosaics, #D114 Mottled Light  
Gray

**Ceramic Wall Tile (Field):** DalTile, Keystone Mosaics, #D014 Light  
Gray

**Ceramic Wall Tile (Accent):** DalTile, Keystone Mosaics, #D023 Cobalt  
Blue (Coordinate location of a accent tile with Contracting Officer.  
Patterns shall not be used.)

**Wood Doors:** Birch Select White, Natural Oil Finish

**Acoustical Tile Ceilings:** White Tile and Grid

**Signage:** System 2/90, Background-Dark Gray, Text-Light Gray

#### 1.4.2 Exterior Finishes

The exterior finish colors for the Control Tower and GATR buildings shall be coordinated with the Contracting Officer. Bright aluminum or metallic finishes shall not be used. Reference SECTION 01003 ARCHITECTURAL REQUIREMENTS for exterior building finishes.

#### 1.4.3 Furniture Footprint

Furniture layout shall be functional, and shall coordinate with the building design to assure that locations of electrical and communication outlets, and lighting within the building are appropriate. The layout will also be coordinated with other building features such as architectural elements, thermostats, lighting, location of TV's, etc. Furniture shall be located in front of windows only if the top of the item falls below the window. The furniture layout shall conform to requirements specified in 36 CFR 1191, FED-STD 795, and NFPA 101. Thirty-five percent furniture requirements are listed in Attachment No. 4 of the RFP and furniture footprint is located on sheets A1.1 and A1.2.

#### 1.5 FURNITURE PACKAGE

A Comprehensive Interior Design (CID) package shall be provided. Furniture and furnishings shall be GF/GI. This includes items such as furniture, systems furniture, artwork, artificial plants and planters, draperies, etc. Thirty-five percent furniture requirements are listed at Attachment No. 4 of the RFP and furniture footprint is located on sheets A1.1 and A1.2. Furniture selections, and finish and upholstery selections shall be

coordinated with the Contracting Officer prior to the 60% submittal.

#### 1.6 Selection and Procurement Methodology

CID package shall be designed in accordance with the Federal Acquisition Requirements, the User Requirements and Contracting/Purchasing Office's procurement methodology. Furniture will be selected from UNICOR Federal Prison Industries (FPI), GSA Stock Catalog, GSA Supply Schedules as directed by the Contracting/Purchasing Office and Base Civil Engineering Office 510CES/CECE. Procurement methodology shall be coordinated with the Contracting/Purchasing Office and Base Civil Engineering Office 510CES/CECE prior to start of CID design. Coordination is required with the Contracting/Purchasing Office, Contracting Officer, and Base Civil Engineering Office 510CES/CECE to insure that the CID package meets the User requirements and is procurable. The determination if Federal Prison Industries furniture shall be specified for this project shall be coordinated with the Contracting/Purchasing Office and Base Civil Engineering Office 510CES/CECE prior to start of CID design. As per coordination with Contracting/Purchasing Office, Contracting Officer, and Base Civil Engineering Office 510CES/CECE, it is determined that FPI furniture will not be used, justification or market research as required by the Contracting/Purchasing Office and Base Civil Engineering Office 510CES/CECE shall be provided to purchase other than FPI product. Waiver request and market research requirements shall be coordinated with the Base Civil Engineering Office 510CES/CECE. GSA justification shall be provided as required by the Contracting/Purchasing Office.

##### 1.6.1 Specification

Materials shall be fire retardant to the maximum extent possible, and U.L. listings shall be met where applicable. User friendly features shall be specified such as radius edges. Sharp edges and exposed connections are not acceptable. Clips, screws, and other construction elements shall be concealed where possible. Considerations shall be made to specify furniture with features that prevent damage from vacuum cleaners and maintenance products. Upholstery fabric shall meet Wyzenbeek Abrasion Test, 50,000 minimum double rubs. A topical or inherent soil retardant treatment is required. Fabric upholstery shall be patterned to help hide soiling. Vinyl, Crypton or hard surface material shall be used in heavy use areas as coordinated with the Contracting Officer. Furniture systems shall be powered and support communications. Coordinate specifics and required furniture features and characteristics with the Contracting Officer. Verify with Contracting Officer which chairs shall be designed for 24/7 use.

##### 1.7 Presentation Format

Presentation requirements for the C.I.D. submittal shall be in accordance with AFCEE Design Guidance (Air Force Center of Environmental Excellence) Interior Design Presentation Format. Reference Sections 01336 and 01338 for additional information.

PART 2 NOT USED

PART 3 NOT USED

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SECTION 01005

STRUCTURAL REQUIREMENTS

PART 1 STRUCTURAL

1.1 PROJECT DESCRIPTION AND REQUIREMENTS

The Control Tower Facility shall consist of a one story structure connected to a six story tower. In addition, a one story GATR building will be provided. Floor, roof and exterior wall configurations shall be as indicated on the attached architectural drawings. The building shall be structurally designed and configured by the Design/Build Contractor in accordance with the criteria and other requirements stated herein.

1.2 DESIGN CRITERIA

The design publications listed below shall be used as sources of criteria for structural design. The criteria from these sources may be supplemented, but not supplanted, by applicable criteria contained in nationally recognized codes, standards, and specifications. (In all cases, later editions to the below listed documents may be used.)

1.2.1 Department of the Air Force Technical Manuals (AFM)

(These manuals are available from the National Institute of Building Sciences Construction Criteria Base (CCB) on CD-ROM free of charge to the successful offeror. Some of these manual may be available to download in Acrobat .pdf file format at the following internet address:  
(<http://www.hnd.usace.army.mil/techinfo>.)

AFM 88-3 Chap. 3 Masonry Structural Design for Buildings (Oct 92)

AFM 88-3 Chap. 15 Concrete Floor Slabs on Grade Subjected to Heavy Loads (Aug 87)

1.2.2 US Army Corps of Engineers Technical Instructions (TI)  
(Available at <http://www.usace.army.mil/usace-docs> and is listed under "Engineer Instructions".)

TI 809-02 Structural Design Criteria for Buildings (Sep 99)

TI 809-04 Seismic Design for Buildings (Dec 98)

1.2.3 American Society of Civil Engineers (ASCE) Publication

ASCE 7-98 Minimum Design Loads for Buildings and Other Structures

1.2.3 American Concrete Institute Publications

ACI 318-95 Building Code Requirements for Structural Concrete and Commentary

ACI 530-92 Building Code Requirements for Masonry Structures and Commentary

1.2.5 Precast/Prestressed Concrete Institute (PCI) Publication

PCI Design Handbook, Precast and Prestressed Concrete,  
Fifth Edition (1999)

1.2.6 1.2.4 American Institute of Steel Construction Publications

Specification for Structural Steel Buildings - Allowable Stress Design,  
Plastic Design (ASD) (June 1, 1989)

Load and Resistance Factor Design Specification for Structural Steel  
Buildings (LRFD) (December 1, 1993)

Hollow Structural Sections Connections Manual (1997)

1.2.5 Federal Emergency Management Agency Publications

(These publications can be obtained at no charge from:

FEMA Report Distribution Center  
PO Box 2012  
Jessup, MD 20794  
Telephone: 800-480-2520; Fax: 301-497-6378)

FEMA 302 NEHRP Recommended Provisions for Seismic Regulations for New  
Buildings and Other Structures : Part 1 - Provisions (February  
1998)

FEMA 303 NEHRP Recommended Provisions for Seismic Regulations for New  
Buildings and Other Structures : Part 2 - Commentary (February  
1998)

1.2.6 [Enter Appropriate Subpart Title Here]

1.2.7 Steel Deck Institute (SDI) Publications

Diaphragm Design Manual (2nd Edition, 1987)

Design Manual for Composite Decks, Form Decks and Roof Decks and  
Cellular Metal Floor Deck with Electrical Distribution (Pub No. 29)

1.2.8 Steel Joist Institute (SJI) Publications

Standard Specifications, Load Tables and Weight Tables for Steel  
Joists & Joist Girders (1994)

1.2.10 United States Air Force Publication

Air Traffic Control Tower Design Guide

1.3 STRUCTURAL LOADING CRITERIA

Structural loading criteria shall be developed using the  
criteria sources and following the procedures indicated below.

1.3.1 Control Tower Facility

The facility shall be classified as a Category IV (Essential Facility), in accordance with ASCE 7-98, for the purpose of calculating wind and snow loads. The Facility shall be classified as a Seismic Use Group III E (Essential Facility), in accordance with TI 809-04, for the purpose of calculating seismic loads.

#### 1.3.2 GATR Building

The GATR shall be classified as Category II building, in accordance with ASCE 7-98, for the purpose of calculating wind and snow loads. The GATR shall be classified as a Seismic Use Group I, in accordance with TI 809-04, for the purpose of calculating seismic loads.

##### 1.3.1 Roof Live Loads

###### 1.3.1.1 Snow Load

Roof snow load shall be calculated and applied in accordance with ASCE 7-98, using a ground snow load of 960 Pa and an Exposure Category C.

###### 1.3.1.2 Minimum Roof Live Load

A minimum roof live load of 1440 Pa shall be used as a loading condition for the roof independent of the calculated snow load.

##### 1.3.2 Floor Live Loads

Minimum uniformly distributed floor live loads shall be as listed below:

<u>AREA</u>	<u>LIVE LOAD (Pa)</u>
Mechanical/Electrical Rooms	7200
Stairs and landings	4800
All Other Areas	4800

The floors shall be capable of supporting an 8.9 kN concentrated load applied over a 760 mm by 760 mm area positioned anywhere.

Stairs and landings be designed to support the uniform load listed above or a concentrated load of 1.33 kN on an area of 2600 mm<sup>2</sup>, whichever produces the greater load effects.

##### 1.3.3 Wind Loads

Wind loads shall be calculated in accordance with the procedures outlined in ASCE 7-98, using an Exposure Category C and a Basic Wind Speed of 40 meters per second. Wind loads for both the main wind-force resisting system and for components and cladding shall be considered.

##### 1.3.4 Seismic Loads

The Control Tower Facility and GATR building shall be designed to withstand seismic loading in accordance with Army Corps of Engineers TI 809-04. Seismic Parameters for the U.S.A.F. Academy are as follows:

$S_s$  (Short Period Spectral Response Acceleration) = 0.19  
 $S_1$  (1 Second Period Spectral Response Acceleration) = 0.058  
Site Classification D.  
Seismic Design Category C.

#### 1.3.5 Dead Loads

Minimum design dead loads for common building materials shall be obtained from ASCE 7-98. Equipment loads and loads for materials not listed in that publication can be obtained from other recognized sources.

#### 1.3.6 Lateral Partition Loads

The minimum design wind pressure on interior partitions shall be 240 Pa normal to the partition.

#### 1.3.7 Design Temperatures

Design differential temperatures shall be a minimum 55 degrees C for thermal analysis of framing systems.

#### 1.3.8 Deflections

Roof and floor members and walls shall be designed to have deflections limited to the following maximums.

##### 1.3.8.1 Floors

The deflection due to live load of structural members supporting floors shall not exceed  $1/360$  of the span.

##### 1.3.8.2 Roofs

The deflection of structural members supporting roofs due to live, wind, or snow loadings shall not exceed  $1/360$  of the member span where plaster or other brittle ceiling materials are attached or suspended, and shall not exceed  $1/240$  of the member span where non-brittle ceiling materials are suspended

##### 1.3.8.3 Partitions

The deflection of interior partitions due to lateral pressures shall not exceed  $1/360$  of the span.

#### 1.4 Wind Drift Index

The Wind Drift Index for The Control Tower Facility shall be  $1/400$  maximum under full wind load. The Wind Drift Index is defined as the lateral displacement at the roof divided by roof height.

#### 1.4 STRUCTURAL MATERIALS

Materials for structural elements shall be as indicated herein or on the attached architectural drawings. Where materials are not indicated, selection shall be at the Contractor's discretion, with the following limitations. Wood products are not acceptable for use as structural elements.

##### 1.4.1 Structural Steel

###### 1.4.1.1 Design

Structural steel shall be designed in accordance with AISC Specification

for Structural Steel Buildings - ASD or LRFD. All structural steel members shall be designed by the structural engineer to support all applicable loads. Structural drawings shall clearly show all structural members, connections, and their locations.

#### 1.4.1.2 Connections

Types of connections shall be consistent with the design assumptions for the basic type of steel construction used. Connections shall be designed and detailed to provide adequate capacities for the applied forces and moments. Connection design shall be the responsibility of the structural engineer and shall not be delegated to the steel fabricator.

#### 1.4.2 Steel Joists and Joist Girders

The design and selection of steel joists and joist girders shall be governed by the Steel Joist Institute (SJI) Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders. The net wind uplift requirements shall be clearly delineated on the drawings. Joists requiring special configurations or design to resist wind uplift and non-uniform loads shall be designated as such on the drawings and the required design loads indicated, per SJI recommendations. Joist end supports and anchorage to resist uplift shall be designed to accommodate the applied forces, including those resulting from wind and seismic activity.

#### 1.4.3 Steel Decking

The design and selection of steel deck shall be in accordance with the provisions of the Steel Deck Institute (SDI) Design Manual. Minimum required section properties of deck sections shall be determined as prescribed by the appropriate Specifications of the SDI Design Manual, and shall be specified or indicated on the drawings. Where the steel deck is designed to function as a shear diaphragm, the design shall be in accordance with the provisions of the Steel Deck Institute (SDI) Diaphragm Design Manual and Army Corps of Engineers TI 809-04.

#### 1.4.4 Masonry

##### 1.4.4.1 Design

Masonry design shall be in accordance with ACI 530-92, AFM 88-3 Chap. 3 and Army Corps of Engineers TI 809-04. Reinforcement shall be sufficient to satisfy the calculated requirements for strength, shrinkage crack control, and seismic design. In no case shall reinforcement be less than the minimum seismic reinforcement required by TI 809-04. If masonry walls are used in conjunction with steel framing as non-load-bearing and non-shear-resisting elements, the connections between walls and the structural steel frames must be designed to allow vertical and horizontal frame deflection without transferring loads from steel to adjoining masonry walls.

##### 1.4.4.2 Masonry Material Properties

Specified compressive strength of masonry shall be  $f'_m = 10.3$  MPa. Hollow concrete masonry units shall conform to ASTM C90, Type I. Concrete building bricks shall conform to ASTM C55, Type I. Type S mortar shall be specified for all masonry. Specified compressive strength of grout shall be 13.8 MPa minimum.

#### 1.4.4.3 Crack Control

Concrete masonry crack control measures comprised of masonry control joints, joint reinforcement, and bond beams shall be incorporated in the design of concrete masonry walls and partitions. Masonry Control Joints (MCJ) shall be judiciously located at spacings no greater than the maximums recommended in AFM 88-3 Chap. 3 and shall be shown on the Architectural elevations. Control joints shall not be placed closer than 600mm to openings.

#### 1.4.5 Reinforced Concrete

##### 1.4.5.1 Design

Reinforced concrete design shall be in accordance with ACI 318 and related current ACI publications which are applicable to the design, TI 809-02 and AFM 88-3 Chap. 15, and Army Corps of Engineers TI 809-04, as applicable. All concrete elements, including slabs-on-grade, shall be reinforced with temperature and shrinkage reinforcement as a minimum. Temperature reinforcement shall be as recommended by ACI and TI 809-02, as appropriate.

##### 1.4.5.2 Concrete Strength

The required 28-day compressive strength of the concrete shall be left to the Contractor's discretion, except that 21 MPa shall be a minimum. For concrete that is to be installed with exterior exposure, air-entrainment, producing a total air content in the concrete between 4 and 7 percent by volume, shall be required. Concrete in contact with soil shall be made with the type of cement indicated in the Final Foundation Analysis].

##### 1.4.5.3 Reinforcing Bar Usage Limitations

Grade 420 bars shall be used for concrete design. When available, grade 300 bars may be used for secondary reinforcement such as stirrups and ties. Minimum bar size shall be #13 bars except for stirrups and ties which may be #10 bars as per ACI.

##### 1.4.5.4 Concrete Joints

Control joints and contraction joints shall be located to reduce concrete cracking to a minimum. All exposed concrete joints shall be sealed with appropriate joint sealants.

#### 1.4.6 Precast Concrete

##### 1.4.6.1 Design

The design shall conform with the requirements of ACI 318, Chp 16 - Precast Concrete and PCI Design Handbook. The precast units shall be designed for all applicable loads indicated in paragraph STRUCTURAL LOADING CRITERIA and the design shall consider all loading and restraint conditions from initial fabrication to completion of the structure. Flexural members shall be designed to support full live load acting in combination with full dead load, plus concentrated loads from any mechanical equipment actually furnished. The effects of initial and long-time deflections as well as transporting the units shall be considered in the design of precast members. Attachment of precast units shall be by welding, bolting or embedment of bars or other connection devices, at the Contractor's option.

#### 1.4.6.2 Precast Concrete Strengths

The required 28-day compressive strength of precast concrete shall be left to the Contractor's discretion, except that 35 MPa shall be a minimum. For any precast units that are to be installed with exterior exposure, air-entrained concrete, with a total air content between 4 and 7 percent by volume, shall be required.

### 1.5 STRUCTURAL FRAMING SYSTEMS

The structural systems used for the Control Tower Facility and GATR building shall be selected and designed by the Contractor. The lateral load resisting system shall incorporate bracing, moment resisting frames, shear walls, diaphragms, or any combination thereof, provided the elements of the system are compatible with the attached architectural floor plan. The seismic force-resisting elements shall conform to the requirements of TI 809-04. The structural framing system chosen shall meet all aforementioned project requirements and the requirements listed below.

#### 1.5.1 Roof Framing

Roofs shall slope as required for the type of roofing system used. The roof slope shall be accomplished by sloping of the structural framing members. The design of roof framing members shall include consideration of any concentrated loads from suspended mechanical and electrical equipment, including cable trays and HVAC units. The location and magnitude of suspended equipment loads shall be closely coordinated with the mechanical and electrical system designs.

#### 1.5.2 Location of Structural Elements

Structural elements, including columns, bracing, shear walls and load-bearing walls shall be located as required by the structural design. The structural design and corresponding selection and location of structural elements shall be compatible with the floor plan, roof plan, elevations and other architectural drawings included in the attachments to this document. Columns shall be located adjacent to walls where possible, and in such a manner that doorways or other accessways are not obstructed. Free standing isolated columns should be minimized. Use of structural bracing shall be minimized, and shall be limited to locations where bracing is concealable at interior or exterior wall lines and does not obstruct windows, doors or other openings. Shear walls, where used, shall be located in coordination with architectural partition requirements.

### 1.6 EXTERIOR/INTERIOR WALLS

Criteria indicated in Section 01003 ARCHITECTURAL REQUIREMENTS shall be incorporated into the design of all walls. The Architectural floor plans included in the attachments to this document indicate the location of walls to be incorporated into the project.

#### 1.6.1 Non-Load-Bearing Walls

Non-load-bearing walls shall be laterally braced by the structure, and shall be connected in a manner which provides for vertical deflection of the structure without inducing vertical loads into the walls.

#### 1.6.2 Shear Walls

Shear walls, where used, shall be constructed of cast-in-place or precast reinforced concrete or reinforced concrete masonry units at the Contractor's choice. Shear walls shall be designed in accordance with ACI 318, ACI 530, AFM 88-3 Chap. 3, and Army Corps of Engineers TI 809-04.

#### 1.7 FOUNDATION SYSTEMS

Design of foundation components shall be the responsibility of the Contractor. The components of the foundation system shall be constructed of reinforced concrete. The required 28-day compressive strength of concrete for the foundations shall be left to the Contractor's discretion, except that 21 MPa shall be a minimum. All parts of the foundation system shall be designed to keep dead load footing pressures relatively uniform, in order to minimize differential settlements.

##### 1.7.1 Earthwork

Earthwork for the Control Tower Facility and GATR building shall conform to the requirements set forth in Technical Specification 02315 EXCAVATION, FILLING AND BACKFILLING FOR BUILDINGS and to requirements stated in the Preliminary Soils and Foundation Information. **Note: Contractor to base final design on his own Final Geotechnical Report, see Attachment No. 1.**

##### 1.7.2 Foundation System

The type of foundation systems used for the Control Tower Facility and GATR building shall be determined by the Contractor. See the Final Foundation Analysis for recommended foundation types (Attachment No. 1).

##### 1.7.3 Design Parameters

Parameters used for foundation design, including pier end-bearing and side friction allowable loads, allowable soil bearing pressure, lateral earth pressure coefficients, and design footing depths shall be in accordance with the Final Foundation Analysis report provided in Attachment No. 1. The weight of any fill added to the site shall be subtracted from the allowable soil bearing pressure to arrive at a net allowable pressure due to structural loads.

##### 1.7.4 Foundation Perimeter Insulation

Perimeter insulation shall be installed on the interior face of all exterior perimeter foundation walls. Insulation shall extend from the bottom of the floor slab down to top of footing or down to design frost depth.

##### 1.7.5 Structural Stoops at Exterior Doorways

All exterior pedestrian doorways require structural stoops. Stoops shall have foundation walls extending down to frost depth and shall be rigidly attached to building foundation walls. Stoops shall have a 300mm layer of uncompacted fill placed directly beneath the stoop slab. The stoop slab shall be flush with the interior floor slab at the threshold and shall slope away from the building at 2% minimum slope.

#### 1.8 CONCRETE SLABS



Design of slabs shall be in accordance with TI 809-02, AFM 88-3 Chap. 15, and the following detailed instructions:

#### 1.8.1 Interior Concrete Slabs-on-Grade

Slabs shall be designed as "floating slabs" without rigid edge support, and with lateral and vertical movement unrestrained, except where noted below. Where compressible filler is used as a cushion, its thickness shall be not less than 50mm. An isolation joint, consisting of a 13mm layer of expansion joint material, is required where slabs abut vertical surfaces. Slab thicknesses shall be selected in accordance with TI 809-02 or as required by design. Slabs shall be reinforced with a minimum of 0.1 percent steel based on cross sectional area. Crack control measures shall be incorporated in the slab design. Control joint details and spacings shall be as delineated in TI 809-02. The required 28-day compressive strength of concrete for slabs shall be left to the Contractor's discretion, except that 21 MPa shall be a minimum.

#### 1.8.2 Geomembrane Vapor Barrier and Geotextile

Interior slabs-on-grade shall be placed over a a 0.5mm unreinforced geomembrane vapor barrier, a non-woven geotextile, and a capillary water barrier material not less than 150mm compacted thickness. The vapor barrier shall be placed directly upon the subgrade material and then covered with the geotextile. Capillary water barrier will be placed over the geotextile. All slab crack control joints, construction joints, isolation joints between edges of slabs and vertical surfaces, and any mechanical, plumbing or electrical penetrations through the floor slab shall be sealed with a flowable polyurethane caulk.

##### 1.8.2.1 Capillary Water Barrier Layer and Sand Layer

Capillary Water Barrier material shall consist of clean, crushed, nonporous rock, crushed gravel, or uncrushed gravel. The maximum particle size shall be 38mm and no more than 2 percent by weight shall pass the No. 4 sieve. The capillary water barrier shall be placed in a minimum of 2 lifts, each compacted by a hand operated, vibratory compactor. Sand will be used to fill voids in top surface of capillary water to provide an even surface for placement of slab.

#### 1.8.3 Slabs to Receive Quarry Tile, Ceramic Tile or Floor Mat Finish

Slabs to receive finishes requiring an inset grout bed or frame shall be 125mm uniform in thickness, and shall be reinforced with #13 bars at 300mm o.c. each way. Slabs shall be depressed as necessary to receive the ceramic tile or the floor mat and frame. At interior edge locations, the slab shall be thickened and doweled into the adjacent slab with 20mm diameter x 400mm long dowels at 300mm o.c..

#### 1.8.4 Concrete Floor Slab Finishes

Exterior ramps and loading docks shall be given a non-slip finish. Slab finishes in other portions of the building shall be left to the discretion of the contractor, subject to the approval of the Contracting Officer.

#### 1.8.5 Interior Equipment Pads

Floor mounted mechanical and electrical equipment shall be installed on 150mm thick raised concrete housekeeping pads. The pads shall be

reinforced with at least the minimum temperature reinforcement required. The pads shall be sized 150mm larger all around than the piece of equipment furnished and all edges of the pad shall be chamfered.

#### 1.8.6 Equipment Vibration Isolation

All vibration producing mechanical and electrical equipment shall be mounted in such a manner as to prevent the transfer of vibrations to adjacent parts or areas of the building. If necessary for any large vibration producing equipment installed within the facility, the equipment will be supported on individual isolated foundations. The isolated foundation shall be separated from the building slab by a continuous 19mm expansion joint.

### 1.9 OTHER STRUCTURAL WORK

#### 1.9.1 Exterior Equipment Pads

Any exterior mechanical or electrical equipment shall be installed on concrete pads. The pads shall be a minimum of 200mm thick and shall be reinforced with at least the minimum temperature reinforcement required. The pads shall be sized 300mm larger all around than the piece of equipment furnished and all edges of the pad shall be chamfered. Design of exterior pads shall be coordinated with Mechanical and Electrical system designs.

#### 1.9.2 Exterior Screen Walls

Exterior screen walls for the purpose of concealing equipment shall be constructed of cast-in-place concrete, precast concrete, or concrete masonry units and shall have a facing to match or compliment the exterior of the main building. Screen wall footings shall extend below frost depth.

PART 2 NOT USED

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-- End of Section --

SECTION 01006

MECHANICAL REQUIREMENTS

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## SECTION 01006

### MECHANICAL REQUIREMENTS

#### PART 1 MECHANICAL REQUIREMENTS

##### 1.1 MECHANICAL SYSTEMS CRITERIA

###### 1.1.1 General Parameters/References

Mechanical systems, including HVAC systems, plumbing, gas distribution and building temperature controls shall be designed to comply with this section and the documents listed below to the extent referenced in this section. The publications are referred to in the text by basic designation only. The most current edition shall be used, whenever a specific edition is not mentioned. The Air Force Academy Mechanical Standard shall take precedence over all standards except for the Design Guide for Air Traffic Control Towers.

Air Force Academy Mechanical Standards. Access at internet website <http://usafa.af.mil> - 10<sup>th</sup> Air Base Wing/CE Engineering Flight/CEC Standards page.

Air Force Manual (AFM) 88-4/Army Technical Manual (TM) 5-548-1, Chapter 5 Gas Distribution.

Air Force Manual (AFM) 88-36/Army Technical Manual (TM) TM -815-2, Energy Monitoring and Control Systems EMCS).

American Society for Testing and Materials (ASTM) publications - A53.

American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE):

Guides; Terminology of HVAC&R, 2nd Edition etc.

Guideline 1, The HVAC Commissioning Process.

Handbooks; 1999 HVAC Applications, 1998 Refrigeration, 1997

Fundamentals, 1996 HVAC Systems & Equipment, 1995 HVAC

Applications, 1994 Refrigeration, 1993 Fundamentals, 1992 HVAC

Systems & Equipment, 1991 HVAC Applications, etc. SI editions

Standards; 15-1994, 62-1989, 90.1-1989 & Addendum 90.1-1989, 52.1-1992, etc..

American National Standards Institute (ANSI) publications - Z83.6, 61; section 8 & 9..

American Society of Mechanical Engineers (ASME), 22 Law Drive, P.O. box 2900, Fairfield, NJ 07007-2900.

Army Technical Instructions TI 809-04 Seismic Design for Buildings, dated Dec 1998

Design Guide for Air Traffic Control Towers - United States Air Force

ETL 94-4 Energy Usage Criteria for Facilities in the Military Construction Program

Federal Uniform Accessibility Standards

Instrument Society of America Standard (ISA S75.01), Current edition.

Mil-Hdbk 1008C Fire Protection for Facilities Engineering, Design and Construction

Mil-Hdbk 1190 Facility Planning and Design Guide

National Fire Codes (NFPA), with most current updates.

National Standard Plumbing Code, National Association of Plumbing-Heating-Cooling Contractors, P.O. Box 6808, Falls Church, VA 22046.

SMACNA Duct Construction Standards

SMACNA Duct System Design

TI-800-01 Energy Conservation Criteria

Underwriters Laboratories (UL 142), (UL 441) Current edition.

## 1.2 GENERAL REQUIREMENTS

The mechanical design shall consist of heating, ventilating, and air-conditioning, gas distribution, HVAC controls and plumbing. Drawings, specifications, design analysis and calculations shall be provided for both the 60 percent design and Final design submittals, and shall be in accordance with SECTION 01336 - 60 PERCENT DESIGN REQUIREMENTS, & SECTION 01338 - 100 PERCENT DESIGN REQUIREMENTS.

This chapter contains instructions and engineering requirements for the mechanical design of the following:

- Equipment Identification and Abbreviations
- Identification of Piping
- Seismic Protection for Mechanical Piping and Equipment
- Thermal Insulation of Mechanical Systems
- Plumbing Systems
- Exterior Gas Distribution Systems
- Interior Gas Piping Systems
- Hydronic Heating Systems
- Heating, Ventilating, and Air-conditioning Systems
- Refrigeration/Chilled Water Systems
- Building Temperature Control Systems
- Testing, Adjusting, and Balancing of HVAC Systems
- CEGS Sections
- Energy Use Budget (EUB) Compliance Check
- Training
- Testing
- Commissioning of HVAC

Provide new mechanical systems, complete and ready for operation. The design and installation of all mechanical systems, including manufacturer's products, shall meet the instructions and requirements contained herein and the requirements of the provided technical guide specifications. Where conflicts between these instructions and the guide specifications or criteria exist, these instructions shall take precedence. Any installation requirements within these instructions, but not contained in the specifications, shall be added to the specifications or shown on the drawings. For minimum specification requirements see paragraph CEGS SECTIONS.

Mechanical designs shall give maximum consideration to the comfort of the occupants. The design shall also be economical, maintainable, energy conservative and shall take into account the functional requirements and planned life of the facility. Mechanical designs shall also consider life cycle operability, maintenance and repair of the facility and real property installed equipment components and systems. Ease of access to components and systems in accordance with industry standards and safe working practices is a design requirement. All like equipment and accessories shall be from a single manufacturer.

Standard Products - Material and equipment shall be a standard product of a manufacturer regularly engaged in the manufacture of the product and shall be essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. The label or listing of the Underwriters Laboratories, Inc., will be accepted as evidence that the materials or equipment conform to the applicable standards of that agency. In lieu of this label or listing, a statement from a nationally recognized, adequately equipped testing agency indicating that the items have been tested in accordance with required procedures and that the materials and equipment comply with all contract requirements will be accepted.

Calculations shall be provided for all mechanical equipment such as boilers, heating & cooling coils, condensing units, unit heaters, piping, pumps, expansion tanks, fans, ducts, louvers, gas services and piping, plumbing, water heaters, and etc. Heating and cooling calculations may be provided by computer analysis i.e., Elite Software Inc., Trane Trace Load 700, Carrier E20-II Hourly Analysis Program (HAP) version 3.04 loads program etc. Provide a block heating load on the facility to be used for boiler sizing. Heat Loss calculation shall use actual design U-values. Add piping losses allowance of 10 percent and future load allowance of 20 percent. Design Energy Usage shall meet or be below Energy Use Budget target (see paragraph ENERGY USE BUDGET (EUB) COMPLIANCE CHECK).

#### 1.2.1 Electronics Room and Control Tower Cab

For the electronics room, include 13.8 kW of equipment HVAC load. For the control tower cab include 17.1 kW of equipment HVAC load and 15 people.

#### 1.2.2 Break Room

For the Break Room, include a microwave, coffee pot, and refrigerator as part of the cooling load.



### 1.2.3 Design and Operating Conditions

**The designed and installed HVAC systems shall keep the facility's areas within plus or minus 2 Deg Celsius from the Operating Conditions listed below.** The following conditions shall be used in designing the mechanical systems:

**Site Elevation:** Equipment design elevation is 2185 meters above sea level. Appropriate corrections shall be made when calculating the capacity of all mechanical equipment installed at this elevation.

**Latitude:** 39 Deg N  
**Heating Degree Days:** 3874 (18 deg C)

#### **Outside Design Conditions:**

Winter: -22°C for outside makeup air and infiltration  
-19°C for building envelope

Summer: 28°C. dB; 16°C. MCWB for building loads.  
30°C air cooled equipment.

#### **Inside Operating Conditions:**

Winter: 7°C. for Mechanical equipment rooms, vestibules and other unoccupied areas (except Electrical rooms).  
21.1°C. for Administrative areas including Conference rooms, corridors, private offices, break rooms, Communications room, LAN rooms, and Electrical room(s) (positive pressurization).

Summer: 24°C. for administrative areas including Conference rooms, corridors, private offices, break rooms, Communications rooms, LAN rooms, and Electrical rooms (positive pressurization). 29.4°C for mechanical rooms.

#### **Minimum Ventilation (Outside Air) Requirements:**

Remaining Rooms Including  
Control Tower Cab 10 L/s supply of outside air per person.

Break Room 50 L/s outside air minimum

Restrooms 10 L/s exhaust per square meter and shall maintain a negative pressure relative to other parts of the facility.

Showers 12.5 L/s exhaust per square meter and shall maintain a negative pressure relative to other parts of the facility.

Janitor's Closets 10 L/s exhaust per square meter and shall maintain a negative pressure relative to other parts of the facility.

Electrical Room(s ) 10 L/s outside air minimum

Mech. Equip. Room  
boiler

10 AC/hour if no boiler but 20 AC/hour if has

**Cooling Loads:**

Lighting/comm. rm./LANS rms. - Coordinate with Electrical designer  
(communications equipment shall be assumed 100% resistive heating)  
PC/monitor/printer = 400 watts total per station  
People - 75 Watts/person sensible and 60 Watts/person  
latent (moderately active office work per ASHRAE Handbook of Fundamentals)  
Solar, Transmission, etc. - ASHRAE Handbook of Fundamentals)

**Building Pressurization:**

Entire building shall be pressurized. Negative pressurization see paragraph  
MINIMUM VENTLATION REQUIREMENTS.

**Security Engineering:**

Provide means to secure (open and/or closed) exterior gas and water  
main(s) valves with padlocks.

**1.2.4 Mechanical Room Layout Requirements**

The mechanical equipment room layouts shall be provided with ample floor space to accommodate routine maintenance of equipment and have head-room to accommodate required equipment. Manufacturer recommended clearance shall be provided around equipment to allow unobstructed access for entry, servicing, and routine maintenance. Space provided in rooms for service and/or replacement of filters, coils, motors, and other equipment items shall be indicated with broken (dashed) lines on the drawings. Provisions for installation, removal, and future replacement of equipment shall be coordinated with the architectural design. The as-built drawings shall be provided in accordance with Section 01040, AS-BUILT DRAWINGS. The arrangement, selection, and sizing of all mechanical equipment shall be such that it can be broken down and removed from the building without dismantling any adjacent systems or structures. A 60 percent design submittal shall be provided for approval to verify mechanical room layout. Fire-rated walls shall be as required in Section 01003 ARCHITECTURAL BUILDING REQUIREMENTS. Mechanical equipment shall be energy efficient per Executive Order 12902, and ASHRAE/90.1. Servicing and maintenance areas interior and exterior to building shall be sized according to manufacturer's recommendations for equipment.

**1.2.5 Mechanical/Electrical Equipment Coordination**

Arrangement of all mechanical equipment and piping shall be coordinated with electrical work to prevent interference with electrical conduits that may run through the mechanical room and to insure adequate space in shared chases. Mechanical equipment (pipes, ducts, etc.) shall not be installed **over or within space** of rooms which are dedicated to transformers, panelboards, or other electrical equipment unless the items serve only that room. When electrical equipment is located in a mechanical equipment room, the dedicated electrical space shall be indicated by a dashed line and noted "Electrical Equipment Space".

#### 1.2.6 General Mechanical Requirements

As applicable, the following shall be provided for all systems:

- a. All piping and equipment located in finished areas of the building shall be concealed or furred-in; exposed piping and equipment is only allowed in utility, equipment, storage and other rooms of this nature.
- b. Provide isolation valves, balancing valve, flow measuring device, and pressure/temperature test taps at all heating and/or cooling units, pumps, hot water unit heaters .
- c. All coils shall be provided with valved drain and air vent connections.
- d. Air vents shall be installed on all high points in piping systems. Drain valves shall be installed at low points and at equipment that must be dismantled for servicing.
- e. Strainers shall be provided with a valved blowdown connection.
- f. All vents, drain valves, and strainers that are located out of mechanical room spaces shall be provided with hose-end connections. All vents, drain valves, and strainers that are located within mechanical room spaces shall be piped to a floor drain.
- g. Provide bypass piping with a balancing globe valve or cock around all non-redundant control and regulating valves. (Not applicable to Fan Coil Units.)
- h. No type of valve other than ball valves shall be provided in the hot water and chilled water systems.
- i. Except at pump intake connections, eccentric reducers shall not be used.
- j. Where steel flanges mate with cast-iron flanges, provide flat faces and full face gaskets.
- k. Piping and supports shall not interfere with equipment maintenance access or pull space.
- l. Dielectric unions shall be installed between dissimilar metals in soldered and threaded piping systems and insulated flanges shall be installed for welded systems.
- m. All underground metallic lines, fittings, and valves; except for cast-iron soil and storm drain piping systems, shall be cathodically protected in accordance with Electrical Section paragraph entitled "Cathodic Protection".
- n. All exterior, underground non-metallic piping shall be buried with pipe detection tape.
- o. Water and natural gas service lines shall be metered where they enter the building and buried with pipe detection tape and tracer wire.

p. All pumps, regardless of service, shall be non-overloading allowing the pump to operate at any point in its characteristic curve.

r. A thermometer shall be installed on the supply and return piping for each coil. Thermometers shall be legible to service mechanics standing at ground level.

s. Temperature/pressure taps shall be provided on the supply and return piping of each coil.

t. Pipe taps, suitable for use with temperature or pressure probe, shall be located at each pressure gauge.

u. Suspended equipment shall not be provided in rooms that have finished ceilings.

v. Expansion Tanks: A floor mounted bladder type expansion tank shall be provided in the heating hot water piping systems. Each expansion tank's precharge pressure and acceptance volume shall be selected based on the layout of its respective piping systems. If there is not adequate floor space, then the Structural Design Engineer shall be thoroughly informed of weights and locations before hanging from the building's structural components.

w. Air Separation Tanks: The heating hot water and chilled water piping systems shall each be provided with an air separation tank. The air separators shall include an automatic air vent and make-up water system, consisting of a pressure reducing valve, strainer, reduced pressure type backflow preventer and isolation valves.

x. Water Treatment Systems: Provide a premixed mixture of 35% propylene glycol and 65% water into the primary loop of both the heating and cooling systems. Provide a shot feeder (chemical feeder) for both of the heating water and chilled water systems to allow introduction of chemicals into each system. Provide the chemical treatment necessary to protect both systems equipment from damage due to corrosion.

y. Air handling Unit Coils: Each air handling unit coil shall be provided with a three-way control valve.

z. Piping: All piping shall be pitched up in the direction of flow (1 inch in 40 feet) (25.4 mm in 12 meters), shall be designed without pockets which would permit accumulation of air, and shall be provided with vents at high points and drains at low points. All new heating and chilled water piping within the facility shall be black steel conforming to ASTM A53, Schedule 40 or copper. Connections to equipment shall utilize unions for pipe 50 mm and smaller and flanges for pipe 65 mm and larger. **PIPING AND EQUIPMENT LOADS SHALL BE COORDINATED WITH THE STRUCTURAL SYSTEM.**

aa. Chilled water storage tank: Provide as necessary to eliminate short cycling of chillers is system volume is less than 1.58 liters per system cooling capacity of 3.51 kW. Tank shall include water baffles with low inlet and high outlet.

bb. All floor-mounted HVAC equipment shall be mounted on 4" concrete pads.

#### 1.2.7 Roof Mounted Equipment

Except for plumbing vents, exhaust fans, and louvered intake penthouses, no other mechanical equipment shall be located on the roof of the facility.

#### 1.2.8 Vibration Isolation/Equipment Pads

Provide vibration isolation devices on all new floor mounted or suspended mechanical equipment . All new floor mounted mechanical equipment shall be provided with 150mm thick housekeeping pads which extends 150 mm all around equipment provided.

#### 1.2.9 Permanent Maintenance Instrumentation

Provide sufficient instrumentation to aid maintenance personnel in balancing and/or troubleshooting mechanical systems. Instrumentation shall be provided in the media at each change in temperature and at all mixing points in air handling systems, at all discharges of air handlers, and at all return mains. Pressure gauges, thermometers, flow indicators, sight glasses, etc., shall be installed to be easily read from the adjacent floor. Separate pressure gauges shall be installed on both the suction end and discharge end of pumps. Provide an isolation valve on all pressure gauges. Thermometers shall have separable socket thermo-wells. Allow for the removal, repair, or cleaning of flow measuring devices without having to shut down the system. Provide a portable meter, with appropriate range, for each type of flow measuring device installed.

#### 1.2.10 Temporary Control Instrumentation

Instrumentation shall be provided for the field calibration of all control and monitoring devices, and for the commissioning of the mechanical systems. Provide local indication measuring instrumentation for each of the HVAC control system components. Local instruments are to be independent of sensing devices used for the control system. The exceptions are air flow measuring stations, turbine flow meters, pitot tubes, and other flow measuring devices that may be shared as sensing devices by local indicating devices and control system devices and are required to be permanent. Local instruments are to be of industrial quality, must be certified as being factory calibrated, and must be capable of field calibration using standard procedures. Measuring provisions shall be provided at each varying input and control output in the system.

#### 1.2.12 Utility Interruptions

Utilities necessary for this facility include electricity, natural gas and water. Certain limitations on utility interruptions apply. Unauthorized utility interruptions will not be permitted. Any work that requires a utility interruption shall be scheduled in advance. Outages are subject to postponement or cancellation by site authorities without prior notification. Coordination requirements of utility interruptions shall be in accordance with SECTION 00800 SPECIAL CONTRACT REQUIREMENTS. All utility interruptions shall be identified with notes on the project drawings.

### 1.2.13 Power Outage Start-Up

Upon an electrical power outage, all air handling units, pumps, and other major mechanical equipment will shut down and shall be restarted in a logical and efficient manner. Timing between starts and sequence of equipment starting upon restoration of electrical power shall be provided and programmed into the HVAC temperature control system, with programming capable of being changed by the operating personnel.

### 1.2.14 Spare Parts Lists

Proprietary spare parts that require more than a 60 day lead time, and/or any special service tools shall be provided to the Government at the Final Inspection.

### 1.2.15 Equipment Room Diagrams

The following "As-Built" information, permanently mounted in a frame and covered by clear Plexiglas, shall be provided in the mechanical equipment rooms:

- a. Air distribution diagrams and damper schedules.
- b. Hot water piping diagrams and valve schedules.
- c. Chilled water piping diagrams and valve schedules.
- d. Control diagrams, control device schedules, and sequences of operation.

### 1.2.16 Interior Design - Color Coordination

All mechanical items located in finished areas and on exterior walls, shall be coordinated with and painted to match the color scheme requirements of CEGS Section 09915, COLOR SCHEDULE.

## 1.3 EQUIPMENT IDENTIFICATION AND ABBREVIATIONS

This Section contains requirements for the identification and abbreviation of mechanical equipment.

### 1.3.1 Equipment Identification

Provide a brass name tag for each valve, temperature control device, control system device, etc., installed in all mechanical systems. In addition, all mechanical equipment shall be clearly identified with a conspicuously located, permanent label. Mechanical equipment shall be identified by type and sequence number. For example, the air handling unit in the building shall be identified as AHU-1, the first hot water pump shall be HWP-1, the second hot water pump shall be HWP-2, etc..

### 1.3.2 Abbreviations

The following list of abbreviations shall be used to describe the HVAC equipment types:

<u>A</u> ir <u>D</u> ryer	. . . . .	AD
<u>A</u> ir <u>H</u> andling <u>U</u> nit	. . . . .	AHU
<u>B</u> oiler <u>R</u>	. . . . .	BLR
<u>C</u> abinet <u>U</u> nit <u>H</u> earer	. . . . .	CUH

C_hilled W_ater P_ump . . . . .	CWP
C_ontrol A_ir C_ompressor . . . . .	CAC
C_ontrol V_alve . . . . .	CV
D_ischarge A_ir T_emperature . . . . .	DAT
D_omestic W_ater H_eater . . . . .	DWH
E_xhaust F_an . . . . .	EF
E_xpansion T_ank . . . . .	ET
F_an C_oil U_nit . . . . .	FCU
F_ilter B_ank . . . . .	FB
F_in T_ube R_adiation . . . . .	FTR
Gov't F_urnished C_ontractor I_nstalled. . . . .	GFCI
Gov't F_urnished G_ov't I_nstalled . . . . .	GFGI
H_ot W_ater P_ump . . . . .	HWP
H_orizontal U_nit H_eater . . . . .	HUH
L_ocal C_ontrol P_anel . . . . .	LCP
M_otor O_perated D_amper . . . . .	MOD
N_ot I_n C_ontract . . . . .	NIC
R_e H_eat C_oil . . . . .	RHC
R_elief H_ood . . . . .	RH
S_upply F_an . . . . .	SF
T_ransfer F_an . . . . .	TF
V_ertical U_nit H_eater . . . . .	VUH

#### 1.4 IDENTIFICATION OF PIPING

All exposed and concealed piping in accessible spaces shall be identified with color coded bands and titles in accordance with the requirements of CEGS Section 09900 PAINTING, GENERAL.

#### 1.5 SEISMIC PROTECTION FOR MECHANICAL PIPING AND EQUIPMENT

This Section contains instructions and engineering requirements relating to the seismic protection design of new mechanical piping, ductwork, and equipment. The facility is to be considered standard occupancy type, essential mission classification.

##### 1.5.1 Piping

Piping within the facility, except fire protection piping, is not required to have seismic restraints. All water pipes for fire protection systems shall be designed under the Zone 1 provisions of the current issue of the "Standard for the Installation of Sprinkler Systems" of the National Fire Protection Association NFPA 13.

##### 1.5.2 Ductwork

Ductwork within the facility, is not required to have seismic restraints.

#### 1.6 THERMAL INSULATION OF MECHANICAL SYSTEMS

Insulation requirements of new mechanical systems, including insulation of plumbing systems and equipment, hot water piping systems, chilled water piping systems and equipment, and the insulation of the duct systems shall

meet the requirements of CEGS SECTION 15080 THERMAL INSULATION FOR MECHANICAL SYSTEMS. Heating piping in heated spaces and conditioned spaces shall be insulated. Hot water piping shall be required to follow tabulated thicknesses. Domestic hot and cold water piping shall be insulated. All ducts shall be insulated in the mechanical rooms and all supply ducts shall be insulated. Cold piping shall have a vapor barrier. High abuse areas shall have aluminum jackets such as janitor closets and mechanical rooms etc.. Internal liner/insulation can be used for low pressure supply ductwork as long as the overall R-value is as great as the specified/required external insulation and as long as the ductwork size is adjusted to accommodate (from a pressure drop perspective).

#### 1.6.1 Insulation Covers

Provide reusable insulation covers at all check valves, control valves, strainers, filters, or any other piping component requiring access for routine maintenance. Insulation exposed to the weather or possible physical damage shall be covered by an aluminum metal jacket. All piping with metal jacket shall be identified on the drawings.

### 1.7 PLUMBING SYSTEM

This Section contains instructions and engineering requirements relating to the design of the new plumbing systems as required. A plumbing system consists of the domestic hot and cold water supply distribution system to the various plumbing fixtures; make-up water piping to the various hydronic type environmental control systems (i.e., expansion tanks, boilers, etc.); fixtures, and fixture traps; soil, waste, and vent piping; and shall extend from connections within the structure to a point 1.5 meters outside the structure. The design of all plumbing systems shall, unless otherwise stated herein, comply with the most current National Standard Plumbing Code and shall meet the requirements of CEGS SECTION 15400 PLUMBING, GENERAL PURPOSE. Traps for lavatories, and sinks shall be chromium-plated, adjustable-bent tube, 20-gauge brass, where exposed. All backflow preventers shall be installed for accessibility per National Standard Plumbing Code and shall comply with the requirements of the Department of Environmental Quality (DEQ) of the State of Colorado. State licensed plumbers shall install and/or test backflow preventers and cross connections devices. For Fire Protection backflow preventer requirements see Section 01008 FIRE PROTECTION REQUIREMENTS. Lead content in the water distribution system (including in-line devices) shall comply with SDWA of 1998 with amendments and ANSI/NSF 61, section 8. In-line devices shall include water meters, building valves, check valves, meter stops, valves and fittings and backflow preventers. Shower mixing valves shall be thermostatic mixing type.

#### 1.7.1 Water Service Entrances

Water service entrance lines shall be installed below the recognized frost line (960 mm) below ground and enter the buildings through the mechanical room floors. Water service entrances shall be provided with a positive displacement type water meter up to and including 50mm, a turbine type water meter for greater than 50mm, and a reduced pressure principal backflow preventer with isolation valves located inside the building. Meters shall be provided with a direct non-resettable, digital readout and remote readout for interlock to the EMCS system. Meters shall have a pulse switch initiator capable pulse output of operating up to speeds of 500 pulses per



minute with no false pulses and shall require no field adjustments or 4-20 ma output. Initiators shall provide the maximum number of pulses up to 500 per minute that is obtainable from the manufacturer. Meters shall be connected to the Siemens Controls APOGEE EMCS system. Meter shall have tele-metering capability.

#### 1.7.2 Piping Runs

Piping runs in buildings shall be arranged to not interfere with movement of personnel and equipment. Neither water nor drainage piping shall be located over electrical equipment or panels. Domestic water piping located outside of mechanical equipment areas shall be routed in the ceiling space above the corridors. Water and waste piping shall not be located in exterior walls or other spaces where there is possibility of freezing. Where piping is to be concealed in wall spaces or pipe chases, such spaces shall be checked to insure that clearances are adequate to properly accommodate the piping. Water piping shall be designed not to exceed a velocity of 1.8 meters per second at full flow.

#### 1.7.3 Pipe Materials

Materials for domestic hot and cold water distribution systems shall be copper. All piping 2-inch and smaller shall be soldered using 95/5 tin antimony solder, piping 2 1/2 inches and larger shall be brazed. Multi-flame torch is not required for soldering or brazing. All underground water service, sanitary, waste, vent and drain shall be plastic piping; PVC or ABS.

#### 1.7.4 Protection of Water Supplies

Cross connections between water supply piping and waste, drain, vent, or sewer piping are prohibited. Reduced pressure type backflow preventers shall be provided on all make-up water systems.

#### 1.7.5 Fixtures

Plumbing fixtures (water closets, urinals, lavatories, kitchen sinks, etc.) shall conform to ASME standards the requirements of CEGS Section 15400 PLUMBING, GENERAL PURPOSE and with lead-free faucets. End-point devices shall meet lead leaching requirements of ANSI/NSF 61, section 9, i.e.. lavatory faucets, kitchen and bar faucets, residential ice makers, supply stops and endpoint control valves). In-line devices do not have to meet section 9 (ie. bath and shower valves, all drains, backflow preventers). Work shall consist of but not be limited to the following. Coordinate location with the architectural plans.

- a. Kitchen sink in Break room.
- b. Electric water coolers located near all rest room entrances.
- c. Floor-mounted Janitor sink in Janitor's closet.
- d. Waterless urinals shall not be allowed; maintenance is required to the trap once every 6 months.
- e. Water conservation fixtures (low flow type) with automatic metering devices conforming to the CEGS SECTION 15400 shall be provided in all restrooms.
- f. Floor mounted waterclosets in the restrooms.

#### 1.7.6 Janitors Closet Sinks

A enameled cast iron or durastone floor mounted type service sink shall be provided in all janitor closets. Overall sink dimensions shall be approximately 700 mm x 700 mm. The depth of the floor sink bowl shall be approximately 250 mm.

#### 1.7.7 Electric Water Coolers

Bi-level, accessible or barrier-free, Mechanically refrigerated electric water coolers shall be provided (as indicated on Architectural plans), with part of each suitable for use by the physically handicapped. Bottom spout unit shall be 675 mm above finished floor. Spout shall be 860 mm above finished floor. The push bar shall be front or front and side mounted. Single mechanically refrigerated electric water coolers shall not be permitted. Cooler shall be lead-free and use CFC-free refrigerant R-134a. Unit shall provide a minimum of 15 L/hour at 10 degrees C.. Coolers shall be certified to meet ANSI/NSF 61, Section 9 and meet lead leaching requirements of section 9.

#### 1.7.8 Water Hammer Arresters

Commercially available water hammer arresters shall be provided at all new quick closing valves such as flush valves and solenoid valves and will be installed according to manufacturers recommendations. Vertical capped pipe columns are not permitted in lieu of arrestors.

#### 1.7.9 Not Used

#### 1.7.10 Not Used

#### 1.7.11 Wall Hydrants

Exterior freeze-proof wall hydrants with vacuum-breaker-backflow-preventer shall be located on outside walls of the facility. A wall hydrant shall be provided near all Mechanical Room exterior doors and another one provided on the other side of the building. Exterior wall hydrants shall be mounted 600 mm above finished grade. Install one wall hydrant at the catwalk for cleaning of the windows.

#### 1.7.12 Wall Faucets

An interior wall faucet shall be provided in all Mechanical Rooms. Wall faucets shall be mounted 900 mm above the finished floor.

#### 1.7.13 Waterclosets

Floor mounted waterclosets with flush valve, siphon-jet, elongated bowl. Floor flange shall be copper alloy, cast iron or plastic.

#### 1.7.14 Urinals

Wall hanging with integral trap and extended shields. Top supply connection, back outlet with siphon-jet.

#### 1.7.15 Service Stop Isolation Valves

For normal maintenance or replacement, servicing stop isolation valves shall be installed in water connections to all installed new equipment and new fixtures. In addition, stop valves shall be provided to isolate portions of systems so as to not require shutdown of entire systems. Stop isolation valves for piping and equipment shall be shown on the drawings. Service stop isolation valves to faucets shall meet ANSI/NSF 61, section 9 lead leaching requirements.

#### 1.7.16 Floor Drains

A floor drain shall be provided in all mechanical rooms, toilet rooms/lockers, shower drying areas, and janitors closets. To prevent traps from drying out, deep seal traps shall be provided on all floor drains located in areas other than mechanical rooms.

#### 1.7.17 Cleanouts

On straight runs of pipe, cleanouts shall be provided at not more than 15 meters apart. Cleanouts shall be provided at each change of direction of pipe and shall be provided at the base of all storm, soil, waste, and vent stacks.

#### 1.7.18 Plumbing Vents

Where feasible, combine circuit vents in a concealed space to a main vent through the roof in lieu of an excessive number of individual vents through the roof. All vent lines through roof shall be 100 mm and terminate a minimum of 150 mm above finished roof. Where vents connect to horizontal soil or waste lines, the vent shall be taken off so that the invert of the vent pipe is at or above the centerline of the horizontal soil or waste pipe.

#### 1.7.19 Duct Drainage

Outside air intake louvers and louvered penthouses shall be ducted and shall have provisions to dispose of melted snow and wind-blown rain, which enters through the louvers. The duct seams shall be sealed watertight soldering or brazing is required - and a drain provided at the duct low point. The drain shall be routed to a floor drain. Duct access doors shall be provided near the louvers.

#### 1.7.20 Domestic Hot-Water

a. Domestic water heaters shall be located in the mechanical room and as adequately sized. New heaters shall be gas fired with a combined water storage tank. The capacity of the water heaters shall be adequate to meet the peak hot water requirements of the facility and shall be designed in accordance with Chapter 48, Service Water Heating, of the 1999 ASHRAE HVAC Applications Manual. An inlet water temperature of 4 degrees C. shall be used for sizing the water heater. Minimum efficiency shall be 80 percent for gas-fired type. Water storage temperature shall be approximately 49 degrees C. to prevent bacterial growth within the tank. Electric instantaneous water heaters may be used for remote restrooms and Cab sink in the tower.

b. Domestic Water Heater Vents

Domestic water heater vents shall be type "B", and shall conform to UL 441. Boiler stacks and domestic hot water heater vents shall not be tied together. Height of vents shall be as required by NFPA 54 and shall be provided with a rain cap. Also, see paragraph Vents and Stacks.

#### 1.7.20.1 Domestic Hot Water Re circulation System

Domestic hot water recirculating pumps shall be provided for each water heater when distance served exceeds 30 meters. Pump sizing shall be in accordance with simplified pump sizing method 1995 ASHRAE Applications Manual unless specific conditions warrant the need for more detailed calculations. The system shall continually circulate domestic hot water in order to insure that domestic hot water is available at each fixture without delay. The domestic hot water recirculating pumps shall be all bronze for long life. A clock or other automatic control shall be installed on domestic hot water circulation pumps to permit operation only during periods of occupancy plus 30 minutes beforehand. Initial operation shall be 24 hours per day.

#### 1.7.21 Storm Drainage

Where required storm drainage system shall include roof drains, overflow drains, leaders, and conductors within the building to a point 5 feet outside the building. Where required by the architectural drawings, roof drains, with auxiliary overflow drains, shall be provided at the low points of the roof. Storm water shall be routed through one common interior downspout and piped directly to the facility storm system. Horizontal storm drain piping shall be plastic. Roof drains shall be designed for a maximum rainfall rate of 6.1 inches per hour (101mm per hour) and shall be sized in accordance with the National Standard Plumbing Code. All elbows for the storm drainage and overflow drainage piping 10 inches and smaller shall be 90 degree short sweep elbows.

#### 1.7.22 Cathodic Protection

Cathodic protection shall be provided for any new underground metallic piping, fittings, and valves except cast iron soil pipe. Design of cathodic protection system shall in accordance with Section 01007 ELECTRICAL REQUIREMENTS, paragraph entitled "Cathodic Protection".

### 1.8 EXTERIOR GAS DISTRIBUTION SYSTEMS

This Section contains instructions and engineering requirements relating to the design of the new exterior natural gas distribution system where required, including the building gas service lines and gas service regulator assemblies. The gas distribution systems shall be designed in accordance with NFPA-54 and shall meet the requirements of CEGS Section 02556 GAS DISTRIBUTION.

#### 1.8.1 Service Line

a. A new service line shall be provided from the high pressure 1½" natural gas line running along Airfield Drive 3500 feet south of the site. The design/build team must verify capacity in the existing line is adequate for this project as well as the existing facilities served by this line. The new service shall have an isolation valve on an anodeless riser. The tap into the existing line may be a "hot tap" and the Base Fire Department shall be

given 30 days advance notification of the date of the tap (see paragraph Service Line Sizing below). The point of connection shall be provided with a shutoff plug valve, conveniently located outside of any traffic area and protected with a valve box.

Service lines shall not be installed under or routed through the facility. Except for piping located at the new gas meter/service regulator assemblies, no aboveground gas piping shall be exposed to view. The service line shall enter the buildings in an accessible location outside the mechanical room(s). The gas meter/service regulator assemblies shall be hidden from view to the greatest extent possible.

b. Service lines to buildings shall run parallel and/or perpendicular to the building lines, shall be buried at least 450 mm below the ground surface, shall not be laid in the same trench with other utilities, and shall be above other utilities whenever they cross. Gas lines shall not be laid under paved streets, parking lots, roads or in other locations subject to heavy traffic whenever practicably avoidable and economically feasible to locate elsewhere. Whenever it is necessary to locate gas lines in such locations, the lines shall be protected by suitable cast-iron-pipe encasement or by burying to a depth to provide at least 1.25 meters of cover over the top of the pipe, except that gas lines shall be provided with suitable cast-iron-pipe encasement when laid under new or existing paved streets, and parking lots.

c. All manholes, valve boxes, or inlets of any nature within the project that do not conform to the new finish grade in either surfaced or unsurfaced areas shall be adjusted to the new finish grade. Where inlets, manholes, or valve boxes fall within a surfaced or unpaved roadway or parking, the existing frames and cover shall be removed and replaced with a heavy-duty frame and cover. The structure shall be adjusted as needed to fit the new conditions. All structures shall be of a type suitable for the intended use and shall conform to the requirements of the applicable section of these specifications

#### 1.8.2 Service Line Sizing

The size of the service lines shall be sufficient to supply the demand without excessive pressure drop and shall not be less than 25 mm in size.

#### 1.8.3 Service Line Materials

All new underground service lines shall be polyethylene and all aboveground lines steel.

#### 1.8.4 Service Line Markers

New underground service lines shall be identified by a permanent on grade utilities marker, which indicates the type of service and depth of burial. Markers shall be located a maximum of 30 meters apart on straight runs and at every change in direction. Markers in high traffic areas shall be protected from physical damage. Markers shall consist of a stamped or engraved brass name plate embedded in concrete.

#### 1.8.5 Service Line Protection

New below grade lines shall be protected from physical damage by placing a continuous, detectable plastic ribbon in the trench such that any excavation will uncover the ribbon prior to reaching the line. When non-ferrous service lines are installed, a foil backed magnetic tape shall be installed above the pipe to permit locating with a metal detector. Metallic tracer wire shall be provided for all non-ferrous service lines.

#### 1.8.6 Cathodic Protection

Cathodic protection shall be provided for underground metallic piping and metallic fittings. Design of cathodic protection system shall in accordance with Section 01007 ELECTRICAL REQUIREMENTS, paragraph entitled "Cathodic Protection".

#### 1.8.7 Gas Meters

A new gas meter shall be provided as part of the new service regulator assemblies. Meters shall be provided with a direct non-resettable, digital readout. Meters shall have a pulse switch initiator capable pulse output of operating up to speeds of 500 pulses per minute with no false pulses and shall require no field adjustments or 4-20 ma output. Initiators shall provide the maximum number of pulses up to 500 per minute that is obtainable from the manufacturer. It shall provide not less than one pulse per 2.8 cubic meter of gas. Meters shall be connected to Siemens Controls APOGEET EMCS. Meter shall have tele-metering capability.

### 1.9 INTERIOR GAS PIPING SYSTEMS

This Section contains instructions and engineering requirements relating to the design of new interior natural gas piping systems. Interior gas piping systems shall extend from the outlet of the gas service regulator/meter assembly to the point of connection of each gas utilization device. The aboveground gas piping system shall be steel designed in accordance with NFPA 54 and shall meet the requirements of CEGS Section 15190 GAS PIPING.

#### 1.9.1 Gas Piping

Piping shall be sized in accordance with NFPA 54 to supply the demand without excessive pressure drop between the point of delivery and the gas utilization equipment. Minimum interior gas pipe size shall be 20 mm. The calorific value of the natural gas to be used in calculations for sizing equipment and piping is 31300 KJ per cubic meter. Gas piping shall be shown on the mechanical HVAC Drawings.

#### 1.9.2 Equipment Connections

The final connection to gas equipment shall be made with rigid metallic pipe and fittings. Accessible gas shutoff valve and coupling are required for each piece of gas equipment.

### 1.10 HYDRONIC HEATING SYSTEMS

Heating system shall be a forced-air/hot water system consisting of one natural gas fired boiler, water distribution system, two circulating pumps, (and associated space heating equipment). The heating system shall be capable of providing all heat for the building (including all outside air

ventilation loads). The heating water piping system shall be used to circulate hot water to the heating equipment during the heating season as indicated herein. The heating system designs shall meet the requirements of CEGS Section 15569 WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH and, unless otherwise stated, shall comply with the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Handbooks and Terminology of HVAC&R guide. The heating system design shall include safeguards to protect against freezing damage. Hot water pipe velocities shall be sized to not exceed 2.5 m/s. Hot water reset shall be provided such that the boilers' discharge temperature does not vary but rather the system supply temperature varies (from 48.9/120 to 93.2/200 degrees C/F - adjustable). This shall be accomplished by means of two 3-way valves with two boiler circulating pumps (one 3-way valve and circulator per boiler). The system hot water supply temperature shall be 93.2/200 degrees D/F (adjustable) when negative 17.8/zero degrees D/F outdoors and shall be 48.9/120 degrees C/F when 12.8/55 degrees D/F (adjustable) outdoors.

#### 1.10.1 Boiler

The hot water supply shall be heated to 95 degrees C. and supplied by natural gas-fired, water-tube type boilers rated for a pressure of 207 kPa. Boiler shall be provided with a forced-draft unless noted otherwise, modulating burners and shall be interlocked with water flow sensor to provide a continuous flow of hot water to the facility at outdoor temperatures below 18 degrees C. (adjustable). The hot water system supply temperature to the space shall be automatically controlled by manufacturer's standard controls. The boiler shall be interlocked with it's heating water flow sensor through the control system, such that the boiler's burner cannot fire unless flow is present through the boiler's piping system. The boiler shall have a minimum efficiency of 80 percent.

##### 1.10.1.1 Boiler Connections

Design of boiler connections and auxiliary equipment shall conform to the requirements of ASME Boiler Code.

##### 1.10.1.2 Low-Water Cutoffs

Float-type safety water feeders with low water cutoffs shall be provided for the hot-water boilers.

##### 1.10.1.3 Water Column Connections

Provide crosses at right-angle turns on water column connections to boiler.

##### 1.10.1.4 Smoke Connection

Boiler flue stack connections shall be in accordance with NFPA 211. Also, see paragraph Vents and Stacks.

##### 1.10.1.5 Boiler Flue Termination

The boiler flue shall extend up through the roof of the building. The flue shall be provided with a rain cap fitting.

##### 1.10.1.6 Boiler Location

The boiler shall be located in the mechanical room.

#### 1.10.1 Heating Water Circulating Pumps

The heating water shall be circulated by two parallel in-line, centrifugal pumps with mechanical seals. Each pump shall be sized for 100 percent of the maximum required heating water flow and 100 percent of the maximum system head pressure. The pumps capacity shall be based on a 95 degree C. supply and 82 degree C. return water. The pumps shall be non-overloading allowing the pump to operate at any point on its characteristic curve. Each pump shall be provided with a suction diffuser and shall be mounted on a 150 mm thick concrete housekeeping pad. Each pump shall be provided with a calibrated bronze balancing valve. Pumps shall run at temperatures below 18.3 degrees C. If one pump should fail, the other stand-by pump shall start (providing 100% of the full flow capacity). Lead/lag pumps shall be alternated automatically so that each pump has approximately the same run time after 14 days of use.

#### 1.10.3 Variable Air Volume Box Reheat Coils

Each VAV Box shall be provided with a two-way control valve. Leaving air temperatures for reheat coils shall be a minimum of 40 degrees C while at 75% of maximum cooling airflow rate (L/s). Heating shall be provided with the automatic volume damper at approximately 75% of the maximum cooling airflow rate (L/s).

#### 1.10.4 Pipe Expansion

In runs of pipe 15 meters and longer, or in shorter runs where required, indicate on project drawings, the location of all anchors, bends, loops, and pipe guides to adequately limit and provide for pipe expansion. Do not use expansion joints in piping unless absolutely necessary and justified. Anchors and guides shall be indicated on the project drawings and detailed for installation in the building structure provided. The structural Design Engineer shall be thoroughly informed of all forces generated.

#### 1.10.5 Vents and Stacks

Stacks shall be in accordance with NFPA 211. Generally all stacks will be of the prefabricated type with individual stack provided for each appliance. Stacks are generally used for forced draft applications. Vents shall conform to UL 441 and be Type B. Vents are generally used for atmospheric burners only. Vents can be tied together to a main vent. Combined stacks shall not be used for appliances with power burners or draft fans. Stacks and vents can not be tied together. Height of stacks and vents shall be as required by NFPA 54 and shall be provided with a rain cap.

#### 1.10.6 Heating of Mechanical Equipment Room(s)

The mechanical equipment room(s) shall be provided with a thermostatically controlled, hot-water, horizontal throw unit heaters to maintain a space temperature of 7 degrees C minimum. The unit heater airflow shall be directed toward the combustion air intake(s) in order to warm the combustion air.



#### 1.10.7 Combustion Air

The mechanical equipment room(s) shall be provided with combustion air louvers sized and located in accordance with NFPA 54. The combustion air louvers shall be provided without dampers and shall be ducted to within 12 inches (300 mm) of the mechanical room roof (in order to minimize the potential for piping freeze-up in the mechanical room due to combustion air intake).

#### 1.10.8 Fintube

Fin tube shall not be allowed.

#### 1.10.9 Unit Heaters

Thermostatically controlled, hot water unit heaters are permitted in non-administrative areas, mech. room(s), and elect. room(s) except that unit heaters shall not be installed in main entrance vestibule(s)- these shall be recessed fan coil units instead for aesthetic reasons.. Unit heaters shall cycle on and off to maintain setpoint.

#### 1.10.10 Electric Resistance Heating

The use of electric resistance heating is not permitted.

#### 1.11 HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS

This Section contains instructions and engineering requirements relating to the design of the new HVAC supply and distribution systems. The design of all systems shall comply with the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Handbooks, to the requirements of NFPA Standards Nos. 90A and 96 Terminology of HVAC&R shall meet the requirements of CEGS Section 15895 AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEMS. Mechanical ventilation and ventilation requirements for occupants shall provide the minimum outdoor air supply rates for occupants in heated or air-conditioned facilities, or both, required by ASHRAE Ventilation Standard 62. Air distribution systems shall be designed to prevent infiltration at the anticipated prevailing wind. Design of variable air volume systems shall ensure proper ventilation rates at low and high system air flow by providing constant volume of outside air. Cooling shall be produced by mechanical ventilation and air conditioning. The use of gas-fired "unit heaters & air-handling units or furnaces" is not permitted. Equipment capacities and flows shall be corrected for altitude on drawings (schedules). Noise Criteria unless otherwise indicated is as follows:

- |                                |               |
|--------------------------------|---------------|
| a. Equipment rooms             | = 60 NC (max) |
| b. Administrative/Office areas | = 30 NC (max) |
| c. Lobby/Toilets/Corridors     | = 40 NC (max) |
| d. Conference rooms            | = 32 NC (max) |
| e. Control Tower Cab           | = 25 NC (max) |

#### 1.11.1 System Designs

All spaces in the facility except for stairs, vestibules, interior janitor closets and interior storage closets shall be either (A: heated and also ventilated by mechanical ventilation) or (B: air-conditioned) as indicated. Vestibules, stairs, etc, shall be heated for freeze protection of

sprinklers only (or Mechanical design shall be coordinated with the Fire Sprinkler Installation for freeze protection). Ventilation in rest rooms/lockers, storage/laundry and janitors shall be for odor exhaust only and shall be provided with time clock control. Unheated or air conditioned closets and storage areas in air-conditioned facilities shall be provided either directly with air conditioned air or provided with exhaust to transfer conditioned air to adjacent spaces. Building shall be maintained at a positive pressure when operating. Excess outside air shall first be relieved through areas generating odors (such as toilet rooms & lockers) then through relief system.

### 1.11.2 Air Handling Units

#### 1.11.2.1 Variable Air Volume AHU System

AHU-1A,1B in Mechanical Room serving the administrative areas and control tower shall be a modular type draw through unit equipped with a hot water pre-heating coil, chilled water cooling coil, and a filter section. The mixed air dampers shall modulate to maintain the minimum outside airflow rate. The two air handling units shall be provided and shall be 100% redundant. Units may be horizontal arrangement stacked vertically to optimize mechanical room space. An intake louver shall be provided on an outside wall and shall be ducted to the end of the AHU filter section. The pre-heating operation shall be capable of supplying the minimum outside air required at a constant discharge temperature and shall be selected with no more than 3 meters/second coil velocity. Minimum outside air shall be relieved through toilet exhausts. The AHU in mechanical room shall be a variable air volume system. The VAV air handling unit shall provide a variable volume of primary air, at a constant temperature, to VAV terminal units in the air handling system. The speed of the supply fan shall be modulated by a variable frequency drive to maintain a constant pressure in the air distribution system. Discharge air reset shall be provided. (ie.  $DAT = 12.8$  degrees C. when  $RAT$  is greater than  $25.6$  degrees C. and  $DAT = 18.3$  degrees C. when  $RAT$  is less than  $21.1$  degrees C.) [ $DAT$ =discharge air temperature;  $RAT$ = return air temperature;  $MAT$ =mixed air temperature;  $OAT$ =outside air temperature). An air flow station shall be provided in the outside air duct to the air handling unit filter/mixing section to provide and maintain minimum outside air requirements. Economizer mode shall not be used due to the large amount of electronics equipment in this facility that would be affected by large variations in space humidity. The VAV box minimums shall be set to maintain the AHU minimum ventilation rate for a fully occupied facility. During unoccupied hours and warm-up mode, the mixed air dampers shall be positioned for 100 percent re-circulation. Each temperature control zone is to be served by a VAV terminal unit that modulates the quantity of primary air supplied to each room with pressure independent controls, to maintain the temperature set point. When the damper in the VAV terminal unit closes to the minimum position, and the room temperature continues to drop, a control valve on the VAV terminal unit heating coil shall modulate open to maintain the room temperature set point. During the unoccupied and warm-up modes of operation, the VAV terminal unit dampers shall be at minimum position, and the VAV terminal unit heating valves shall be open. The air handling unit supply and return fans cycle to maintain the set back room temperature and to warm-up the rooms to the occupied heating set point during the warm-up mode of operation.

### 1.11.3 Filtration

Indoor air quality is of primary concern. The combined supply air, including return and outside air, shall be filtered by a combination of 25 to 30 percent efficient pre-filter(s) and 80 to 85 percent final filter as determined by the dust spot test specified in ASHRAE Standard 52.1.

#### 1.11.4 Ductwork

Supply air duct (for all VAV ductwork upstream of the VAV boxes) shall be sized using the static regain method. All other ductwork shall be sized using the equal friction method. Supply air ducts from VAV air handling units to VAV boxes shall be built to at least medium pressure standards and class A seal requirements. Private offices shall be zoned by exposure and/or function and shall not be zoned with open areas or conference rooms. The control tower cab and observation level shall be served by shut-off type VAV terminals with hot water reheat similar to the administrative areas. The terminals serving the cab shall be constant volume with the unit damper set to fail open. Ductwork sized using the equal friction method shall be done using 0.6 Pa per meter for supply ducts and 0.8 Pa per meter for return and exhaust ducts. Medium pressure duct velocity shall never exceed 12 meters/sec. Ductwork shall be metal except for fan connections. Low pressure duct velocity shall not exceed 8 meters/sec. Ductwork serving Administrative areas shall typically be run above the ceiling in the corridors. Fifteen feet (4.6 m) of return air duct to each air handling unit shall be provided with acoustical liner 15 feet (4.6 m) (This is the minimum amount of return air duct that will be accepted for each air handling unit). Flexible ductwork shall never exceed 2 meters in length. All ductwork shall be constructed from galvanized sheetmetal, in accordance with SMACNA guidelines.

#### 1.11.5 Variable-Air Volume Boxes

VAV Boxes shall be concealed above ceiling of the controlled space and provide varying amounts of conditioned air in response to a space thermostat. All VAV boxes shall be equipped with a hydronic reheat coil with a two-way control valve. Minimum heating airflow rate shall be set for 30% of full cooling airflow rate.

#### 1.11.6 Ceiling Mounted Supply Diffusers

Ceiling diffusers shall be suitable for use in a lay-in ceiling or a gyp board ceiling and shall be located as necessary. All new diffusers shall be provided with a 4-way discharge pattern; standard diffusers with fixed discharge patterns are not permitted. Diffusers shall be sized to distribute the required quantity of air evenly over the space intended without causing noticeable drafts, air movement faster than 15 meters per minute in the occupied zone, or causing dead spots anywhere in the conditioned space (Maximum velocity of 3 meters/sec with a NC of 30 maximum).

#### 1.11.7 Ceiling Mounted Return Grilles

Ceiling return air grilles, suitable for use in lay-in ceilings or gyp board ceilings, shall be located as necessary. The maximum size of new return grilles shall be 600 mm X 600 mm, minimum size shall be 600 mm X 300 mm. Return grilles shall not be located close to outdoor openings or in locations where bypassing of supply air may occur. Recommended return air velocities based on free area of the opening shall be 3 meters/sec.

#### 1.11.8 Supply and Exhaust Fans

Except for wall mounted propeller units, all fans shall be centrifugal type and connected directly to weather-proof louvers using ductwork. Low leakage motorized dampers shall be provided. Fans larger than 944 L/s in capacity shall be provided with V-belt drives. Care shall be taken to ensure that the noise level generated by exhaust fans and associated relief louvers is not transmitted to the exterior of the building. In-line fans located outside the main mechanical and electrical areas shall be provided with a manufacturers standard acoustical enclosure to inhibit noise transmission to the adjoining occupied spaces. Sone value of fans measured 1.5 meters from fan inlet shall be less than 30 sones outside the mechanical equipment room. Sound transmission data shall be submitted for approval and design shall indicate noise criteria on schedules.

#### 1.11.9 Outdoor Intakes and Exhausts

New outdoor air intakes shall be located in areas where potential for air contamination is lowest such as away from overhead doors and such that noise is not transmitted to the interior of the building. Maximize the distance between intakes and exhausts by maintaining a minimum distance of 10 meters between intakes and exhausts and between intakes and toilet, janitor room and etc.. Motorized low-leakage damper with blade and jamb seals, shall be provided at all outside air intake and exhausts. If feasible, locate intakes and exhausts on different building faces. Maximum velocity through net area of air intakes shall be limited to 3 meters/sec. Required L/s shall be corrected for altitude.

#### 1.11.10 Special Requirements

##### 1.11.10.1 Toilet Rooms

The rest rooms shall be exhausted at the required rate (see paragraph Design and Operating Conditions).

##### 1.11.10.2 Janitors Closet

The janitors closet shall be exhausted at the required rate (see paragraph Design and Operating Conditions). The required make-up air for the exhaust system shall be supplied through a door grille (sized for a velocity of 3 meters/sec or less).

##### 1.11.10.3 VAV Box System For Control Tower Cab

The control tower cab shall have its own VAV terminal boxes and respective thermostat controlled only by the cab occupants and located out of direct sunlight. HVAC load calculations must include 17.1 kW of equipment load and 15 people in the cab. Calculate Cab HVAC load with no shading on the windows. Multiple VAV boxes shall be used to allow for system back-up. The VAV boxes will be constant volume serving the Cab and located in the above ceiling of the observation room. Ductwork from the VAV boxes will run up to the raised floor area of the Cab to pressurize the raised floor area. Linear bar supply diffusers will be hard ducted down into the raised floor.

##### 1.11.10.4 Mechanical Equipment Room(s) (MER)

The MER(s) shall be ventilated and cooled with outside air at a minimum rate of 20 AC/hr by a thermostatically controlled supply fan set to operate when temperature exceeds 29.4 degrees C.

#### 1.11.10.5 Electronics Room

The electronics room shall be served by a dedicated VAV terminal unit (cooling only). HVAC load calculations must include 13.8 kW of equipment load.

#### 1.11.11 Transfer/Return Air Openings/Ducts

These openings/ducts shall be sized for a velocity of no more than 1.17 M/s (200 fpm). The openings/ducts shall incorporate fire dampers wherever the fire rating for the respective wall is 1/2 hour or more. The OVERALL pressure drop for the worst case shall not exceed 12.5 Pa (0.05" water column" back to the air handler (so doors will not be difficult to open or held open and/or closed by the pressure differential created).

### 1.12 REFRIGERATION/CHILLED WATER SYSTEMS

These systems shall meet the requirements of CEGS Section 15650 CENTRAL REFRIGERATED AIR-CONDITIONING SYSTEM and unless otherwise stated, shall comply with the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Handbooks and ASHRAE 15. Refrigeration equipment provided shall utilize either refrigerant R-407 or HFC-134A (have an ozone depletion factor of 0.05 or less). HCFC-22 is not allowed.

#### 1.12.1 Air Cooled Chillers and Related Equipment

Each chiller shall be air-cooled and have its own dedicated chilled water pump. All components (chiller, air handling unit, coils, pumps etc.) shall be corrected (both head pressure and flow) to give capacity with 35% propylene glycol. Two chillers, with 100% total design cooling capacity each (total design cooling capacity including all outside air loads for the entire facility), shall be provided. The entire chilled water system including all piping, equipment and appurtenances, shall be filled with a pre-mixed solution of 35 percent propylene glycol and 65 percent water (by volume). This solution shall be added after all pressure testing and cleaning of piping systems has been satisfactorily completed and prior to testing and balancing of the systems. Chiller shall be a packaged unit. Chiller shall be provided with at least four steps of capacity reduction. Chillers must include low ambient controls down to -10 degrees C to allow for year-round operation.

#### 1.12.2 Chilled Water System.

Air-conditioning shall be designed chilled water/glycol mix as required in paragraph 1.12.1 as the cooling media. The pumping, piping and hydronic ancillaries scheme shall be designed to include components described for the HYDRONIC HEATING SYSTEM that are applicable such as piping, pipe expansion, air separators, expansion tanks, pumps, water treatment, air handling unit coils, etc. piping velocities shall be sized to not exceed 2.5 m/s.

#### 1.12.3 Other Systems

The use of evaporative cooling, heat pump, and dx coil type systems will not be permitted.

#### 1.12.4 Chilled Water Circulating Pumps

Two (one per chiller) base mounted centrifugal pumps with mechanical seals shall circulate the cooling water. Each pump shall be sized for 100 percent of the maximum required chiller capacity and 100 percent of the maximum system head pressure. The pumps shall be non-overloading allowing the pump to operate at any point on its characteristic curve. Each pump shall be provided with a suction diffuser and mounted on a 150-mm thick concrete housekeeping pad. Each pump shall be provided with a calibrated bronze balancing valve and check valve. Pumps shall run at temperature above 18.3 degree C. (adjustable)

#### 1.1.13 BUILDING TEMPERATURE CONTROL SYSTEMS

This Section contains instructions and engineering requirements for the design of the new building temperature control systems required for the operation of the building mechanical systems. The temperature controls shall be Siemens Controls and shall be fully integrated and connected to the Base EMCS APOGEE system supplied by the Contractor and coordinated with Siemens Controls in this contract. The design of the control systems for the HVAC equipment shall be in accordance with CEGS Section 15951 DIRECT DIGITAL CONTROL FOR HVAC, attached. Siemens Controls shall re-program the head-end computer to accommodate the Control Tower facility and provide equipment and services, including software database programming, graphics generation, calibration and end-to-end testing of the head-end computer (in the EMCS room of Bldg. 2354, and this project's remote DDC panels, DTCs and temperature control panels. EMCS fiber shall be extended in accordance with Section 01007 ELECTRICAL REQUIREMENTS. The control system shall be designed to provide continuous and automatic control of all HVAC equipment. Where equipment is provided with a packaged control system, such as in the case of a boiler or chillers, the building control systems will interface with the equipment's packaged control systems. The temperature control panels shall be located in the mechanical room(s). The number of and types of equipment in the final design shall dictate the number of control panels. This type of control system(s) allows the building operator to easily adjust setpoint, operating times and other system parameters, if and when necessary, after the building has been occupied.

Notwithstanding Section 00700 Contract Clauses FAR 52.236-5, Material and Workmanship, for the DDC/EMCS shall be manufactured by Siemens Controls in order that the systems installed are fully compatible and fully integrated and connected to the Base Siemens Controls APOGEE EMCS system. No other product will be acceptable. The competition Advocate authorizes sole source procurement.

#### 1.13.1 General DDC Requirements

All mechanical systems and equipment, shall be controlled by local direct digital control (DDC) panel(s) located in the facility Mechanical room. The DDC panel(s) shall operate in a stand-alone fashion. A Siemens Controls design shall be provided, using CEGS Section 15951 DIRECT DIGITAL CONTROL FOR HVAC, as attached. To facilitate maintenance and to allow manual starting and stopping of equipment by maintenance personnel, a hard-wired Hand-Off-Automatic (HOA) control switch shall be provided for each new

major piece of equipment (air handling unit, pump, exhaust fan, etc.) in order to override the automatic DDC start and stop functions. Coordination with and input from the Base, and existing facility User & (Siemens Controls) has been required in order to ensure that the appropriate system points are monitored. The temperature controls for the control tower cab shall only be monitored by the base EMCS, the occupants shall have full control of the space setpoints.

a. Fire alarm condition on any fire alarm circuit shall automatically initiate the deactivation of the air handling units throughout the building.

b. All computing devices, shall be as defined in FCC Rules and Regulations FCC Part 15, and shall be certified to comply with the requirements for Class A computing devices and labeled as set forth in FCC Rules and Regulations FCC Part 15.

c. Temperature Control Contractor Experience - The temperature control Contractor shall have a working knowledge of Siemens Controls system and experience installing these systems. The Contractor shall provide for approval the names and qualification of supervisory personnel (i.e. Project Manager and /or Superintendent) that will be used on this project. The Contractor shall also provide a list of references to be contacted from recent projects on which the proposed personnel performed similar duties. Approval shall be based on previous experience with Siemens Controls systems, qualifications and demonstrated ability of proposed personnel to manage resources in an efficient and effective manner. Experience and supervisory personnel qualifications must be submitted and approved before submittal of any technical data.

d. Emergency Service - The Government will initiate service calls when the installed DDC/EMCS is not functioning properly. Qualified personnel shall be available to provide service to the complete DDC/EMCS installed under this project. Qualified personnel shall be defined as a factory trained journeyman in the brand of control system provided, this level of training shall be considered a minimum. The Government shall be furnished with a telephone number where the service supervisor can be reached at all times. Service personnel shall be at the site within 8 hours after receiving a request for service. The control system shall be restored to proper operating condition within 3 calendar days after receiving a request for service. This requirement shall be for one year in addition to the warranty period at no cost to the Government.

e. Software - The Contractor shall provide all software updates and verify operation in the system. These updates shall be accomplished in a timely manner, fully coordinated with base operators, and shall be incorporated into the operations and maintenance manuals, and software documentation provided as submittals in section 15951. There shall be at least one scheduled update near the end of the first year's warranty period, at which time the Contractor shall install and validate the latest released version of the Contractor's software.

f. All utility meters shall be connected to the base Siemens Controls APOGEE EMCS system to allow the necessary monitoring.

g. Fuses shall not be used for surge protection.

h. System descriptions and analyses submittal shall include "and shall indicate how new system will interface with the existing Base EMCS as manufactured by Siemens Controls"

i. Scheduled inspections shall be at the beginning of construction.

j. Temperature sensors for the DDC controllers shall be selected to be standard Platinum 100 Ohm elements that would permit their use with electronic or DDC controls from other sources of supply. Other readily available control devices or standard commercial grade control devices as normally sold by the major temperature controls companies and necessary for control system operation shall be specified.

#### 1.13.2 Existing SIEMENS CONTROLS APOGEE EMCS Interface

The control system serving the facility shall be a system expansion of, and sourced to match, the existing Base EMCS. All services, materials, equipment, hardware, and software necessary to install the EMCS expansion and for interfacing to the existing system shall be provided. At the completion of the system expansion, all the new control panels and input and output control points/devices shall be fully integrated into the existing system.

##### Operator Access

Access to the system expansion by the Base EMCS operators shall be seamless via the existing workstations on the EMCS LAN and the expansion connections to it. That is, it shall require no different hardware or software or operation steps to access than any of the control panels on the existing system. System expansion access shall allow the EMCS operator to perform the following real-time functions on the new equipment using the same workstations and software required for accessing the existing EMCS:

- a. Display the status of all inputs.
- b. Display and manually change the status of all outputs.
- c. Display and adjust all control loops and all other permanent (battery-backed RAM and/or EEPROM-based) database parameters.

##### Graphic Screens

Provide and integrate graphic display screen files into the existing system, each consisting of a schematic diagram of a mechanical system with real-time statuses of new inputs and outputs superimposed upon the schematic diagram. In conjunction with existing software base packages, the screens shall allow an operator to not only view, but also command changes to the statuses of all outputs.

##### Alarm Monitoring

Alarm monitoring shall be provided for all major pieces of equipment. Indication of failure shall alarm at the existing EMCS Operators Workstation. The maximum allowable time for the EMCS to display an alarm condition is 10 seconds starting from the time the alarm condition first exists. The maximum allowable time for equipment to respond to manual EMCS commands is 10 seconds starting from the time the command is initiated at the work station. The system expansion shall not impede the capabilities of the Siemens Controls APOGEE EMCS to meet these requirements. Alarm monitoring shall include, but not limited to the following alarm indications:

- Loss of flow
- Loss of power
- High and low pressure



Freeze detection  
Summary alarm  
Start/stop actual status different from commanded state

Each start/stop is to be paired with a true status input. EMCS alarms shall be generated whenever the status input state varies (longer than some adjustable time delay) from the corresponding output's matching state.

#### 1.13.2.1 Not Used

#### 1.13.2.2 Controllers

Except in the case of application specific controllers (ACS), All modulating mechanical processes (e.g., temperature, pressure, flow control) shall be controlled directly by the local DDC control panel. Except for safety and protection functions, software logic shall be used in lieu of relay logic. The contacts of safety and protection function instruments shall be hard wired in series with the common side of each equipment's HOA switch, and their proper operation shall not depend in any way upon the DDC.

#### 1.13.2.3 Digital Controllers

Digital controller blocks or points within the control panels shall utilize a full proportional algorithm. Digital controller blocks or points within the control panels shall utilize a full proportional-integral-derivative (PID) algorithm which can provide the following combinations of control modes: P, PI, PD, and PID. Controllers shall eliminate integral windup when controlled equipment is shutdown. Provide remote adjustment capabilities for the following parameters via the normal Siemens Controls APOGEE EMCS operator interface:

- a. Input manual/automatic.
- b. Input value in engineering units (when in manual).
- c. Proportional, integral, and derivative gains.
- d. Direct/reverse action.
- e. Output manual/automatic.
- f. Output value in percent of full output range (when in manual).
- g. Anti-windup initiation.

#### 1.13.2.4 Stand-Alone Operation

The local control panels, although fully integrated into the Siemens Controls APOGEE EMCS network, shall be capable of stand-alone operation in the event of a complete failure of the network. When communication is lost with the network, local programs, including those based upon real-time clock or calendar events, shall continue to function without operator intervention. "Local" or "non-global" programs are considered to be those which are not dependent upon multiple controllers for either input information or output actuation. A program which requires a shared input, or "global" value, communicated over the network from another controller (e.g., a boiler temperature reset based on outside air temperature) shall continue to operate with the last valid value received prior to a loss of communication.

### 1.13.3 Input/Output Devices

The control system shall utilize off-the-shelf input and output instruments (e.g., RTD sensors, actuators, relays) which are commercially available from third party vendors and who are independent from the DDC panel manufacturers.

### 1.13.4 Analog Sensors, Digital inputs & Digital outputs

All sensing devices shall be capable of removal from the system without disruption of service to the system in which they are installed. Sensors provided shall include, but not limited to, the following:

- Supply air, return air, & outside air; Air Flow Measuring Stations (to be shown on mechanical HVAC drawings)
- Boiler inlet temperature
- Boiler outlet temperature
- Boiler fuel flow
- Boiler water reset
- Heating water flow
- Chilled water flow
- Chilled water inlet temperature
- Chilled water outlet temperature
- Space temperature(s) (to be shown on mechanical HVAC drawings)
- Outside air temperature sensors (to be shown on HVAC mechanical drawings)
- Mixed air temperature sensors
- Discharge air temperature sensors
- Preheating Coil Controls
- Heating Coil Controls
- Chilled water Cooling Coil Controls
- Hot water pump(s) status
- Hot water pump(s) start/stop
- Chilled water pump(s) status
- Chilled water pump(s) start/stop
- Air handling unit status
- Air handling unit start/stop
- Kilowatt meter
- Gas meter
- Water meter

Liquid flow measurement for use by the DDC system shall be performed by paddle wheel-type flow sensors only. Pitot-type sensing elements may be installed for local instrumentation used for testing and balancing purposes only.

### 1.13.5 Cable and Wiring

Cable and wire for the DDC system shall be separate from the distribution system serving any other system. All cable and wiring shall be installed in conduit. The data transmission media (DTM) shall be provided by the Contractor. The DTM shall be fiber optics cable complying to Class A computing devices as set forth in FCC Part 15. The Contractor shall provide data transmission media (DTM). DTM shall be as specified and extended as shown on the electrical drawings in accordance with section 01007 ELECTRICAL REQUIREMENTS.

#### 1.13.6 Control Valves

Sizing of control valves shall take into account upstream and downstream fittings and shall be in accordance with Instrument Society of America standard ISA S75.01-1985.

#### 1.13.7 Variable Air Volume Boxes

VAV boxes shall be fitted with DDC controllers and velocity sensors compatible with the existing Siemens Controls APOGEE EMCS. VAV box temperature sensors shall be located atop an associated return grille and be provided with 9.2 meters of sensor wire for future relocations. Where VAV air handling units with VAV boxes are provided, flow monitoring stations shall be provided to ensure proper indoor air quality when operating at minimum supply air flows.

#### 1.13.8 Damper Actuators

All dampers shall be provided with 4-20 ma-operated damper actuators.

#### 1.13.9 Valve Actuators

All valves shall be provided with 4-20 ma-operated valve actuators.

#### 1.13.10 HVAC Control Drawings

HVAC control drawings, for both the 60 percent and Final submittals, shall be in accordance with SECTION 01336 - 60 PERCENT DESIGN REQUIREMENTS, & SECTION 01338 - 100 PERCENT DESIGN REQUIREMENTS. Control drawings for each facility shall include a system schematic section, an elementary (ladder) diagram, a detailed sequence of control, a list of required components with a brief description of each component, a control panel detail, legend and schedules, a listing of input and output points and a matrix showing the point type, alarms and applications programs associated with each of the input or output points. EMCS details and points to be monitored will be detailed on the contract drawings and follow the conventions as set forth in TM 5-815-2. System I/O summaries will be detailed.

#### 1.13.11 Control Schematic

The control schematic shall be a schematic representation of the HVAC system and the associated control equipment. The control schematic shall be drawn to a large scale to allow for ample space to indicate any necessary performance parameters such as setpoint, etc.. The control schematic shall be cross-referenced to the elementary diagram and the control panel detail by numbered terminal points. Each component shall be identified by a unique alphanumeric designator such as S1 for sensor number 1. This provides a means of cross-referencing to the description of components and the sequence of control. All major control items relative to the system shall be shown. This may include, but shall not be limited to:

- Supply Fans
- Filters
- Cooling Coils
- Heating Coils
- Pressure Sensors/Switches

Flow Sensors/Switches  
Freezestats w/manual reset  
Smoke Detectors w/connection to the FACP  
Temperature Sensors  
Valves and Valve Actuators  
Dampers and Damper Actuators  
VAV Boxes

#### 1.13.12 Elementary Diagram

An elementary diagram or diagrams shall be provided showing the wiring of the control system devices. It shall be drawn to a large scale for easy reading and to allow space for indicating performance parameters. The elementary diagram shall be cross-referenced to the control schematic and the control panel detail through the use of numbered terminal points.

#### 1.13.13 Sequence of Control

The sequence of control is a written statement of the operation of the system. It should be as detailed and complete as possible and it should refer to individual components by their alphanumeric designator whenever possible. The sequence shall break the overall system into sub-systems, such as supply fan control, mixed air control, pre-heating coil, heating coil control, cooling coil control, etc., and shall describe the operation of each of the subsystems. The sequence of control shall also describe the operation of all safety devices such as smoke detectors or freezestats, fire alarm interlock and shall describe the operation of the system in both the occupied, warm-up and unoccupied modes.

#### 1.13.14 Description of Components

The description of components shall provide a generic description of the performance of each component. The components shall be referred to by their alphanumeric designator.

#### 1.13.15 Control Panel Detail

The control panel detail shall show the intended mounting location of any devices that are to be located in the control panel or on the front face of the panel. All field sensors and controls will be connected to data terminal cabinets to provide ease of diagnosis and repair of the system components. DTC panels shall be as specified in section 15951 with installed spares plus 25 percent expansion of each type of I/O function being provided. Control panels and DTC panels shall be shown on mechanical drawings.

#### 1.13.16 Legends and Schedules

The legend shall provide a definition of all symbols used in the control drawings. Schedules shall provide all necessary information to clarify the operation of the components or the overall system.

#### 1.13.17 System Checklists and Startup Instructions

The designer shall develop Pre commissioning Test Checklists, Functional Performance Test Checklists, and Startup Instructions for each system and

item of equipment controlled by the temperature control system and shall include them in the temperature controls submittals. Each system and item of equipment shall have its own separate Checklist and Startup Instructions. The Checklists and Startup Instructions shall be tailored to each individual component of the respective system or item of equipment and shall use the terminology and nomenclature used in the drawings and specification.1.14 TESTING, ADJUSTING, AND BALANCING (TAB)OF HVAC SYSTEMS

Testing, adjusting, and balancing shall be meet the requirements of CEGS Section 15990 TESTING, ADJUSTING AND BALANCING OF HVAC SYSTEMS and all TAB shall be complete, including all test and inspection reports, before starting the EMCS Field Test.

#### 1.15 CEGS SECTIONS

Government provided (CEGS) Corps of Engineers Guide Specifications (available to the Design-Build Contractor as indicated in Section 01332, SUBMITTALS FOR DESIGN) shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product and installation requirements for the facility. The specifications shall be edited in accordance with the designer notes associated with each specification and with the Specification Requirements (Division 01 General Requirement Specifications). In case of a conflict, the criteria found in the Specification Requirements (Division 01 General Requirement Specifications) shall take precedence. The provided specifications define the minimum requirements for items of equipment, materials, installation, training, operating and maintenance instructions, O&M manuals and testing that shall be provided for the facility. Where items of equipment, materials, installation, training, operating and maintenance instructions, O&M manuals or testing requirements are not specified in the provided specifications, special paragraphs within each applicable guide specification shall be prepared to specify those items. Specific items of equipment identified in the provided specifications but not required for the facility shall be edited out. The specification, SECTION 15951 DIRECT DIGITAL CONTROL FOR HVAC, has been completely edited by the Corps of Engineers' Designer for this project and is to be considered as an extension of the Specification Requirements. Government approval is required for any specification addition or deletion from SECTION 15951 DIRECT DIGITAL CONTROL FOR HVAC.

#### 1.16 ENERGY USE BUDGET (EUB) COMPLIANCE CHECK

Design energy Usage (DEU) estimates shall be calculated for the new building to verify compliance with EUB. Energy Usage Budget shall be done without process loads. Values indicated below shall be the maximum EUB target allowed. DEU shall be less than Energy Usage (EUB) target values indicated in Table I.

Table I  
Energy Usage Budget Target For This Project.

Building	Type	Region	EUB Target	Days/Week
Control Tower	W	6	680 Mjoules/sq. meter/yr	7

M = Million

#### 1.16.1 Computer Simulation

The Energy Usage Budgets shall be calculated using a computer simulation. Method used must take into account the constantly changing temperatures, sun loads, etc., through a year's operation. Use of the program "BLAST" is encouraged. If "BLAST" is used, the "REVIEW SUMMARY REPORT" shall be included in the output report. Any program other than Building Load Analysis and Systems Thermodynamics "BLAST", "TRANE TRACE 600", Carriers' latest version, DOE 2.1.E or BESA (Canada) requires prior approval for use. Request for use must demonstrate compliance with the following:

##### 1.16.1.1 Acceptable Engineering Procedures

The energy analysis and building simulation will use a computer program that is based on acceptable engineering procedures. Load calculations and the systems simulation will be on an hourly basis for 12 to 365 days. Although hourly data for 365 days is preferred, a minimum of 12 model days (a statistically average day per month) is acceptable. If calculations are based on less than 365 days, the weather data selected for these days will be statistically derived.

##### 1.16.1.2 Capable of Change

The computer program must be capable of changing the various cooling and heating loads and the thermostat settings to simulate building operations and to simulate dead band and deck/coil reset control strategies.

##### 1.16.1.3 Cooling and Heating Loads Influencing the Building Design

The program must consider all cooling and heating loads that influence the building design. These include solar, outside air, people, lighting, equipment, etc., as well as taking into account the thermal time lag of materials.

##### 1.16.1.4 Alternatives

Some of the alternatives that the program should be capable of analyzing include:

- a. Orientation of Building.
- b. Wall and roof construction and insulation.
- c. Dimensions of Building.
- d. Window area, solar shielding, tinted, and single or multiple glazed windows.
- e. Types of fuel.
- f. Central heating versus individual systems.
- g. Type of equipment.
- h. Type of mechanical systems, e.g., Constant/Variable volume, single zone/multizone.
- i. Type of lighting systems, e.g., standard incandescent or fluorescent and low wattage, high output lighting systems.

#### 1.16.2 NOT USED

#### 1.16.3 Summary Report

Provide a summary section in the separate energy analysis report and results in the design analysis. Include all input data such as U values, design temperatures, hours of operation, building population and size, etc. Include output data such as distribution percentages (lighting, heating, cooling, fan, etc.).

#### 1.17 TRAINING

A training course (2 to 4 hours in the classroom or actual time to cover everything, whichever is greater) shall be conducted for 3 to 5 operating staff members (designated by the Contracting Officer) in the maintenance and operation of all systems. A two-week notice shall be given the Contracting Officer for start of training. For guidance in planning the required instruction, the Contractor shall assume that the attendees will have a high school education or equivalent, and are familiar with the systems. No training shall be scheduled until training manuals and O&M manuals have been approved by the Government. A minimum of 3 O&M manuals shall be provided for the instructions and 1 manual for each facility shall be given to the Contracting Officer to turnover to the Base Civil Engineer.

##### 1.17.1 Training Course Content

The courses shall be taught at the project site. The training courses shall cover all the material contained in the Operating and Maintenance Instructions, and O&M manuals the layout and location of each system and shall include the following for each system:

- a. Troubleshooting
- b. Diagnostics
- c. Calibration
- d. Adjustment
- e. Commissioning
- f. Repair procedures

(1) Typical systems and similar systems may be treated as a group, with instruction on the physical layout of one such system. The results of the performance verification tests and the calibration, adjustment and commissioning reports shall be presented as benchmarks of the system(s) performance by which to measure operation and maintenance effectiveness.

#### 1.18 ENGINE-GENERATOR SYSTEM.

**1.18.1. Generator Set Selection.** Designer notes contained in the Corps Of Engineers Guide Specifications should be read and understood prior to initiating design. It is not uncommon for manufacturer's standard cataloged generator sets to not meet the requirements of the guide specifications. Engines larger than those cataloged with standard generator sets are often required to conform to the guide specifications. The designer must ensure that adequate space is provided to accommodate a generator set that conforms to the specifications. A minimum of three generator sets shall be selected which conform to the specifications. The selections shall be included in the Design Analysis. Space for the generator set shall be based on the largest of the selected generator sets.

**1.18.2. Generator Set Locations.** Generator sets are located inside and should be provided with a remote radiator located outside to eliminate the ventilation problems associated with an interior radiator. If the radiator must be located indoors, provisions must be made to recirculate the discharge air from the radiator into the room to lessen the amount of outside air required. The recirculation dampers shall be controlled to maintain the space at 80 Deg.F during \*winter. Interior generator sets shall be located on concrete equipment pad isolated from the building. When generator sets are located exterior, they shall be housed in a factory fabricated housing.

**1.18.3. Mechanical Ventilation.** Rooms containing generator sets shall be provided with mechanical ventilation to prevent excessive interior temperatures.

**1.18.4. Jacket Water Heaters.** Jacket water heaters will be specified for all generator set applications installed inside or outside. Glow plugs will be required for all units installed exterior. Either will not be required unless specifically requested by the Customer.

**0.0.5. Fuel System.** The design and installation of fuel systems shall conform to NFPA No. 30 and NFPA No. 37.

**0.0.5.1. Fuel Tank.** Fuel storage tanks shall be installed underground or above ground. Tanks will be double wall or provided with other leak and spill containment and leak detection conforming to Federal and local regulations. Piping shall be double walled with leak detection to meet all Federal and Local regulations. If the fuel tank is requested by the Customer to be installed above ground, the designer shall ensure that the Customer is aware that fuel conditioners may have to be added to the fuel in winter to prevent fuel gelling at low temperatures. Fuel storage tanks shall be sized for a 3-day fuel supply for standby units and a 30-day supply for prime power units.

**0.0.5.2. Day Tank.** An auxiliary or day tank should be provided to ensure a ready supply of fuel to the engine. Day tanks shall be sized to provide a minimum of two hours operating supply for the engine but in no case will the fuel storage capacity exceed that permitted by NFPA No. 31 and NFPA No. 51. Each day tank shall be provided with a vent to the exterior, an overflow piped to the main storage tank, and a valved drain. Day tanks shall be located so that when full, the fuel level is below the engine fuel injectors.

**0.0.5.3. Fuel Piping.** Fuel piping in prime power plants will be installed in floor trenches with removable covers. Fuel oil piping in standby plants will be installed to minimize tripping hazards and will be installed in floor trenches if practical.

**0.0.6. Mufflers and Exhaust Piping.** When generator sets are installed inside, the muffler shall be installed inside to eliminate unsightly exterior muffler installations. Mufflers and exhaust piping installed inside shall be insulated. Exhaust pipe outlets shall discharge horizontal, be directed away from buildings, and shall be a minimum 10 feet (3 m) above the ground. The discharges shall be mitered to minimize entry of snow and rain.



1.19 ELEVATORS. ELEVATOR DESIGN AND VENTILATION SHALL FOLLOW ANSI A17.1 AND THE CORPS OF ENGINEERS GUIDE SPECIFICATIONS.

#### 1.20 COMMISSIONING OF HVAC SYSTEMS

This section contains instructions and engineering information relating to the commissioning of HVAC systems, including the pre commissioning checks and functional performance tests. Commissioning shall begin only after all work required in paragraphs entitled "Testing, Adjusting, and Balancing of HVAC Systems" and the "Temperature Controls System" have been successfully completed, and all test and inspection reports and operation and maintenance manuals required in other Section's specifications have been submitted and approved. The commissioning of HVAC systems shall meet the requirements of CECS Section 15995 COMMISSIONING OF HVAC.

a. Pre-commissioning Checks shall be performed for each item of mechanical equipment. Deficiencies discovered during these checks shall be corrected and retested prior to start of the Functional Performance Tests.

b. Functional Performance Tests shall be performed for each equipment item. Functional performance tests shall begin only after all pre-commissioning checks have been successfully completed.

c. Commissioning of HVAC systems shall begin only after all work required in related sections, including Sections HVAC Control Systems and TAB of HVAC Systems has been successfully completed. All test and inspection reports and O&M manuals shall be submitted and approved before commissioning is conducted.

-- End Of Section --

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SECTION 01007

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## SECTION 01007

### ELECTRICAL REQUIREMENTS

#### PART 1 ELECTRICAL DESCRIPTIONS AND NARRATIVES

##### 1.1 GENERAL

Electrical systems, including, but not limited to exterior power distribution, interior power, exterior and interior lighting, communication systems, security systems, emergency power systems, and cathodic protection shall be designed to comply with this section chapter and the documents listed below to the extent referenced in this section. The publications are referred to in the text by basic designation only.

Drawings, specifications, and design analysis shall be provided for both the 60 percent design and Final design submittals, and shall be in accordance with SECTION 01336 - 60 PERCENT DESIGN REQUIREMENTS, & SECTION 01338 - 100 PERCENT DESIGN REQUIREMENTS. Calculations shall be provided in accordance with SECTION 01336 - 60 PERCENT DESIGN REQUIREMENTS, & SECTION 01338 - 100 PERCENT DESIGN REQUIREMENTS and this section.

Provide new electrical systems, complete and ready for operation. The design and installation of all electrical systems, including manufacturer's products, shall meet the instructions and requirements contained herein and the requirements of the provided technical guide specifications. Where conflicts between these instructions and the guide specifications or criteria exist, these instructions shall take precedence. Any installation requirements within these instructions, but not contained in the specifications, shall be added to the specifications or shown on the drawings. For minimum specification requirements see paragraph TECHNICAL SPECIFICATIONS.

Electrical designs shall give maximum consideration to the comfort of the occupants. The design shall also be economical, maintainable, energy conservative and shall take into account the functional requirements and planned life of the facility. Electrical designs shall also consider life cycle operability, maintenance and repair of the facility and real property installed equipment components and systems. Ease of access to components and systems in accordance with industry standards and safe working practices is a design requirement. All like equipment and accessories shall be from a single manufacturer.

Floor mounted equipment shall be provided with equipment pads.

##### 1.1.1 References

Publications, codes, specifications and standards shall be used as the basic for the project design and shall include, but not be limited to the following. Publications and codes which use language which implies a recommendation shall be taken to be mandatory. The latest edition for each publication shall be used.

AFJMAN 32-1080

Electric Power Supply and Distribution

AFJMAN 32-1083 Facilities	Facilities Engineering, Electrical Interior Facilities
ASME/ANSI A17.1	Safety Code for Elevators and Escalators
ADAAG	Americans with Disabilities Act - Accessibility Guidelines for Buildings and Facilities
EI 16E500	Lighting Design
IEEE C2	National Electrical Safety Code
IEEE 142	Recommended Practice for Grounding of Industrial and Commercial Power Systems. (Green Book)
IEEE 1110 Equipment (Emerald Book)	Powering and Grounding Sensitive Electronic
IEEE 466 Commercial	Emergency and Standby Power for Industrial and
MIL HDBK 1008C and Construction	Fire Protection for Facilities - Engineering, Design,
NFPA 70	National Electrical Code (NEC)
NFPA 75	Standard for the Protection of Electronic Computer/Data Processing Equipment
NFPA 90A	Installation of Air Conditioning and Ventilating Systems
NFPA 101	Safety to Life from Fire in Buildings and Structures, 1994
NFPA 780	National Lightning Protection Code
NACE RP0169	Control of External Corrosion on Underground or Submerged Metallic Piping Systems
NACE RP0190	External Protective Coatings for Joints, Fittings, and Valves on Metallic Underground or Submerged Pipelines and Piping Systems
IES HANDBOOK	Illuminating Engineering Society Handbook, 1993
LIGHTING STANDARDS	Corps of Engineers Standard Lighting Fixture Details Drawing Series No. 40-06-04 <a href="http://cadlib.wes.army.mil">http://cadlib.wes.army.mil</a> CADD Details Library, Electrical Details USACE Standard Details 40-06-04, Oct. 97
DISTRIBUTION STANDARDS	Corps of Engineers Standard Electrical Distribution Details. <a href="http://cadlib.wes.army.mil">http://cadlib.wes.army.mil</a> CADD Details Library, Electrical Details Electrical Service and Distribution

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TELECOMMUNICATIONS INDUSTRY ASSOCIATION/ELECTRONIC INDUSTRIES ASSOCIATION  
(TIA/EIA) .

568A                      Building Telecommunications Wiring Standards

569                      Commercial Building Standard for Telecommunications Pathways and  
Spaces

570                      Residential and Light Commercial Telecommunications Wiring  
Standard

606                      The Administration Standard for The Telecommunications  
Infrastructure of Commercial Buildings

607                      Commercial Building Grounding and Bonding Requirements for  
Telecommunications

Design Guide                      Air Traffic Control Tower Design Guide is found in  
Attachment No. 9 and on web site  
[http://www.3di.com/sanantonio/atct1001/images/ATCT\\_RAPCON\\_Guide.pdf](http://www.3di.com/sanantonio/atct1001/images/ATCT_RAPCON_Guide.pdf)

#### 1.1.2      Facility Description

A new GATR building with antenna towers is to be provided and a new Control Tower with a Control Tower Support Facility. The design shall comply with the requirements given in the United States Air Force Academy (USAFA) Communication Standards located in Attachment No. 5. In addition, the Control Tower and control Tower Support Facility shall comply with the requirements in the Air Traffic Control Tower Design Guide.

#### 1.1.3      STANDARD PRODUCTS

Material and equipment shall be a standard product of a manufacturer regularly engaged in the manufacture of the product and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. The label or listing of the Underwriters Laboratories, Inc., will be accepted as evidence that the materials or equipment conform to the applicable standards of that agency. In lieu of this label or listing, a statement from a nationally recognized, adequately equipped testing agency indicating that the items have been tested in accordance with required procedures and that the materials and equipment comply with all contract requirements will be accepted.

#### 1.1.4      Seismic Protection

Seismic Protection for electrical equipment shall be designed and installed in accordance with the requirements of Seismic Protection for Miscellaneous Equipment Specification SECTION 13080 and Seismic Protection for Electrical Equipment Specification SECTION 16070a.

#### 1.1.5      Special Environmental Conditions

Electrical equipment such as facility transformers, generators, motors, and other electronic assemblies shall be derated for altitude - 2184 meters (7166 feet).



Motor capacity can be derated similar to procedure used for generators or a service factor of 1.15 shall be stipulated.

Generators shall be derated for altitude (1 percent for each 100 meters (330 feet) or fraction thereof above 1000 meters (3300) feet mean sea level).

Derate oil-filled transformers at one-half the percentage applied to generators in the above paragraph.

#### 1.1.6 Building Work Demarcation

A demarcation line extending 1525mm (60-inches) from the perimeter walls of a building has been established to distinguish between work performed under building specifications and site work documents. (Example: underground conduit under a floor slab and extending to the 1525mm (60-inch) line would be covered by UFGS 16415A and beyond that point by UFGS 16375A.)

#### 1.1.7 Accommodation of Disabilities

All designs shall incorporate provisions of the Americans With Disabilities Act Guidelines (ADAAG), NFPA 72 and the Uniform Federal Accessibility Standards (UFAS). All aspects concerning placement and sizing from these standards shall be incorporated. In case of a conflict between the ADAAG and the UFAS or the ADAAG and NFPA 72, the ADAAG shall govern. Provisions pertaining to clearances shall generally be accommodated by other disciplines, however the design shall observe some precautions such as avoiding equipment configurations which would project into restricted clear space in corridors.

#### 1.1.8 Color of Exterior Equipment

All exterior electrical equipment such as the service entrance transformer, pad-mounted switches and the emergency generator shall be factory painted brown. Exact shade of brown shall be verified with the User.

#### 1.1.9 Demolition of Existing Facilities

If guidance isn't given for a specific building. The Contractor shall remove the electrical service from the facility back to the service transformer. The service transformer, pad, grounding shall be removed, if it is a dedicated transformer. The high voltage lines shall be removed from the transformer to the splice point or junction point. Resplice as required. The communication lines shall be removed back to the nearest manhole or exterior cabinet and resplice. All equipment shall be disposed of properly unless indicated to be turned over to the Contracting Officer or User (base). Remove all electrical equipment in the building. Demolition of some of the facilities are an option. See other Sections regarding contract options.

The Contractor shall survey these facilities for the presence of fluorescent light fixtures. It is estimated that Building 9212 contains approximately 41 fluorescent light fixtures, Building 9232 contains approximately 20 fluorescent light fixtures, Building 9215 contains approximately 10 fluorescent light fixtures, Building 9229 contains 3 fluorescent fixtures, and Building 9205 contains 5 fluorescent light fixtures. Light fixtures that were installed prior to 1978 shall be assumed to have polychlorinated biphenyl (PCB)-containing ballasts. Unless the ballasts are labeled "No PCBs," they shall be assumed to contain PCBs.

The contractor shall assume that all the ballasts contain PCBs or are unmarked for bidding purposes. All fluorescent lamps that are removed shall be assumed to contain mercury. The contractor shall assume three lamps per fixture. These fixtures shall be removed prior to demolition and appropriately disposed of or recycled. If the light fixtures will be reused by the Contractor, they will not be considered waste. Disposal/recycling requirements shall be in accordance with Federal and state regulations and shall be detailed in the demolition specification. Ballasts and fluorescent light tubes shall be packaged and shipped (with proper documentation) in accordance with U.S. EPA and U.S. Department of Transportation regulations. Disposal or recycling of these materials shall be coordinated with the Contracting Officer and USAF Academy Environmental Section. Care shall be taken to ensure that breakage of fixture components and subsequent release of mercury or PCBs does not occur. Management of any spill or release that occurs during handling of fixture components and subsequent disposal of the resulting waste is the responsibility of the Contractor and shall be conducted, under applicable regulations, at no additional cost to the Government. See also Section 01410 ENVIRONMENT PROTECTION, COMPLIANCE, AND PERMITS regarding waste disposal and recycling requirements. All handling, packaging, transportation, and disposal/recycling requirements shall be detailed in the demolition specification.

#### 1.1.9.1 Control Tower #9212

The generator (60 kW) and automatic transfer switch shall removed and turned over to the base through the Contracting Officer (CO) or the CO representative. Power to the facility is obtained from manhole FL16 (old number is AF16), which feeds three-phase power to the pad-mounted transformer (75 kVA). Remove primary cabling back to load-break cabinet. Provide blank covers for the empty termination bushings. See Exterior Primary Electrical Distribution System for special requirements associated with this removal.

#### 1.1.9.1 Runway Supervisory Units #9232 and #9229

Remove transformer and all equipment at each unit. The transformer is a small 50 kVA or 25 kVA single-phase transformer. Remove direct buried cables back to load break junction in manhole. Provide blank covers for the empty termination bushings.

#### 1.1.9.2 Building #9205

Power to the facility is obtained from manhole FL14 (old number is AF14). Remove direct buried cable from transformer to manhole. See Exterior Primary Distribution System for special requirements associated with new GATR building.

#### 1.1.9.3 Building #9215

Power to this building is from Control Tower #9212 and is low voltage. Remove power connection between the two facilities. Remove and scrap old antenna poles and equipment mounted on the poles and GATR site building. There are four wood poles, each one approximately 30m (100 ft) in height. The generator and automatic transfer switch shall removed and turned over to the base through the Contracting Officer (CO) or the CO representative.

### 1.2 COORDINATION OF ELECTRICAL CRITERIA

All electrical criteria provide in this section shall be coordinated with the architectural section, mechanical section, fire protection section, structural section, interior design section, civil, environmental and site section, and all other sections not mentioned here. The number and location of all electrical equipment indicated in the electrical requirements are approximate. Contractor design shall meet the intent of the electrical requirements provided in this section. Contractor shall coordinate the final locations of all electrical equipment with the BASE USERS to be provided by the Contracting Officer in the Field after the award of the RFP.

### 1.3 EXTERIOR PRIMARY ELECTRICAL DISTRIBUTION SYSTEM

The existing base primary electrical distribution system is a 12470/7200Y volt, 3-phase, 4 wire (grounded neutral), 60 Hertz underground distribution system. Contractor shall install new primary line in duct banks to a new pad mounted transformer located by the GATR Building and by the Control Tower/Control Tower Support Bldg. Power distribution shall comply with AFJMAN 32-1080, IEEE C2, and IEEE 142.

#### 1.3.1 New GATR Building #9205

New GATR Building shall obtain power from a manhole FL14. Use the empty bushings provided by the removal of Building 9205.

#### 1.3.2 AC Storage Hangar, Building #9210

Building 9210, AC Storage Hangar. Power to the facility is going to be disrupted by the removal of power to Building #9212. The transformer feeding #9212 contains feed-thru bushings which are used to power the transformer at 9210. The contractor shall run a new duct bank system (two ducts) from manhole FL16 to the existing transformer. Provide new conductors and load breaks to make the connection at the load break junction and transformer. Contractor shall verify existing conditions in order to determine best location for breaking into existing ducts and best routing. If the power is down more than 48 hours at 9210, the contractor shall provide a generator to power the facility. Provide power outage information to Contracting Officer 14 days in advance. Written approval is required before proceeding.

#### 1.3.3 Control Tower and Control Tower Support Facility #9231

There is only three-phase power currently available at the site. The power shall be 12470/7200V, three-phase. There are two incoming power feeds at manhole FL-7 (old number is AF-7). The Government shall provide a three-phase vacuum switch to be placed in the manhole. The contractor shall do all necessary work for the installation to include providing and installing load-breaks, splices, grounds, etc. In order to bring three-phase power to the site the contractor shall use one of the following methods:

##### 1.3.3.1 Three-phase Power #1

There is an existing manhole system which runs up to the site from manhole FL-7. The duct bank doesn't contain any spares. The contractor can remove the existing single-phase #1/0, 15 kV lines from the manhole system and pull in a new three-phase #1/0 line in the same duct. Contractor shall provide generator power for the buildings affected during the process. A partial list of buildings includes 9229, 9232, 9234, 9228, 9230, and some

other airfield loads. Contractor shall provide all necessary load-break junctions, to be located in the manholes, to feed the existing single-phase loads.

#### 1.3.3.2 Three-phase Power #2

There is an existing manhole system which runs up to the site from manhole FL-7. The duct bank doesn't contain any spares. The contractor can add two additional ducts between the existing manholes (one for the circuit and one for a spare). One duct would then have a new three-phase #1/0 line pulled in.

#### 1.3.3.3 Three-phase Power #3

A new communication manhole/duct bank system is being installed from manhole FL-6 in this contract, which runs up to the site. The communication manhole/duct bank system can be made a combination communication/power manhole duct bank system. A minimum of two power ducts are required (one for the three-phase power and one for a spare).

### 1.4 EXTERIOR UNDERGROUND PRIMARY ELECTRICAL REQUIREMENTS:

All exterior electrical equipment shall have a paint coating rated for 120 hours of salt spray exposure. Exterior pad mounted equipment shall be painted brown. Coordinate exact color of brown with the User. For Information Only drawings provided in drawing package show approximate routing of existing utilities. This information shall be field verified.

#### 1.4.1 Not Used

#### 1.4.2 Medium Voltage Cables

The primary cable shall be 133 percent insulated copper conductors EPR shall be installed in concrete encased ducts. Minimum burial depth shall be 1066.8mm (3'-6") below finished grade. A 600 volt neutral shall also be installed in the same duct as the primary feeder and grounded at the pad mounted transformer. Use copper stranding for the shielding. Cables with concentric neutrals shall not be used. All conductors shall be tested after installation. The cables shall be #4/0 copper unless otherwise indicated. The copper neutral conductor shall be the same size as the medium voltage cables. Medium voltage cables shall be located in concrete encased ducts.

#### 1.4.3 Terminations and Splices

All primary load break elbows and termination kits shall be rated 15 kV. Splices shall be allowed in manholes. All splices and load break elbow drain wires, etc. shall be grounded to the ground ring in the manhole per IEEE C2.

#### 1.4.4 Pad-mounted Tamperproof Compartmental Transformers

The pad mounted transformer shall be a 12470 volt, three phase, delta primary with grounded-wye secondary; oil-immersed unit (non-PCB), outdoor type with copper windings and conductors at the Control Tower. The oil used shall be a less flammable type. Aluminum is not acceptable. The transformer shall be looped fed, dead front, bayonet-fused with the elbow lightning arrestors. Place the elbow lightning arrestors on the empty

bushings. Provide a single "T" style loop-feed sectionalizing switch in the high voltage compartment. See Exterior Underground Secondary Electrical Distribution Requirements for pad transformer secondary distribution voltages. Transformer pad shall extend 254.0mm (10") beyond the edge of the transformer furnished. Transformer pad shall use knock-out areas instead of pouring around the conduit. Provide at least one spare 102mm (4") conduit stubbed 1524mm (5') out from transformer. Provide grounding conductor counterpoise around transformer pad (#1/0 AWG minimum) and at least two ground rods located at opposite ends of the counterpoise with a minimum of two ground connections between the transformer and the counterpoise. The transformer shall be painted brown. Verify exact color of brown with the User.

The pad mounted transformer shall be 12470 volt, single-phase oil immersed (non-PCB), outdoor type with copper windings and conductors at the GATR building. The oil used shall be a less flammable type. Aluminum is not acceptable. The transformer shall be dead front, looped fed, bayonet-fused with elbow lightning arrestors. Place lightning arrestors on the empty bushings. See Exterior Underground Secondary Electrical Distribution Requirements for pad transformer secondary distribution voltages. Transformer pad shall extend 254.0mm (10") beyond the edge of the transformer furnished. Transformer pad shall use knock-out areas instead of pouring around the conduit. Provide at least one spare 78 mm (3") conduit stubbed 1524mm (5') out from transformer. Provide grounding conductor counterpoise around transformer pad (#1/0 AWG minimum) and at least one ground rod in the compartment area and two ground rods located at opposite ends of the counterpoise with a minimum of two ground connections between the transformer and the counterpoise. The transformer shall be painted brown. Verify exact color of brown with the User.

#### 1.4.4.1 Locations

Transformers of the mineral oil insulated or low flammability ("non-flammable", "less flammable liquid-filled") type shall be located not less than 25 feet from combustible walls or building openings. Where this is not feasible, the requirements of Mil Handbook 1008C shall be met.

#### 1.4.4.2 Grounding

a. When the transformer is delta on the primary, but the primary system voltage is a grounded-wye, bring the neutral (grounded conductor) and connect to the ground lug on the transformer.

b. Frame of the transformer is to be grounded from the high voltage equipment pad and the low voltage equipment pad.

c. On a grounded-wye secondary, a ground strap is required from X0 to the frame, which is in contradiction with SECTION 16375A.

e. When a building has a lightning protection system with a ground ring and the transformer has a ground ring and the ground rings are within 25 ft of each other, then the ground rings shall be interconnected below grade.

f. Service from transformer to building should not have a grounding conductor. NEC does not require this conductor. If the service is a bus duct, there may be a benefit to installing a grounding conductor of the same size as the neutral.

g. Install a ground ring (counterpoise), minimum size shall be #1/0 AWG,

around concrete pad with a ground rod at each corner. The ground ring size shall be increased in size to the proper size per IEEE, if the fault current indicates that #1/0 AWG is not adequate.

h. Extend separate conductors from arresters and transformer neutral/housing and connect to the ground ring.

i. Ground any metallic conduit/duct to the ground ring.

j. Provide any other connections required by the NEC or NESC.

#### 1.4.5 Manholes and Duct Banks

All new distribution primary lines shall be installed underground in a concrete encased duct bank with 103mm (4") conduits. There shall be one spare 103mm (4") conduit/duct with pull wire for each filled conduit/duct as a minimum. The duct/conduit used in the concrete-encased duct bank shall be schedule 40 pvc. Contractor shall either bore or push 103mm (4") electric conduits under roadways. Roadways shall NOT be cut for new duct bank crossing. New electric power manholes shall be provided at 90 degree turns and outside the facility as a minimum. Distance between manholes shall not exceed 100 meters (300 feet) and not more than 360 degrees of total bend. Also risers shall be located not more than 46 meters (150 feet) from manholes. Provide an analysis with calculations and pulling criteria if these limits are exceeded. Electric manhole covers shall be stamped "Electric" or similar wording to indicate an electric manhole. Minimum size of manholes shall be 2134mm (7ft) by 2134mm (7ft) by 1829mm (6ft) high. Each manhole and handhole shall have at least two ground rods and a looped ground conductor (ring) around the manhole supported by the cable racks, but have mounted at least 30 cm (12 inches) above the floor. Where the ground rod enters the concrete, the ground rod shall be taped with electrical tape to 15 cm to each side of the concrete. Each manhole shall have mounting hardware to support the cable. The hardware shall be grounded to the grounded conductor if metallic. Non metallic hardware is preferred. Each manhole shall have hardware to allow for the pulling of conductors installed at the duct bank entrance. Each manhole shall have a permanently installed ladder as part of the manhole. The neck shall be securely attached and not just laid in place. The neck shall also be sealed water tight. Necks made of bricks shall not be used. Conductors shall be looped around the manhole. All conductors in manholes shall be firetaped. Each circuit shall be fire taped individually. Exterior primary distribution system shall be designed in accordance with Electrical Distribution System, Underground SECTION 16375A; and the requirements of this section. A ground rod shall be installed in each manhole. Power and communications ducts can be installed in the same trench. The power and communication ducts would be on the same horizontal level. No other utilities are allowed in the trench.

#### 1.5 EXTERIOR UNDERGROUND SECONDARY ELECTRICAL DISTRIBUTION REQUIREMENTS.

Exterior secondary electrical distribution system to the facility shall be 480Y/277 volt, 3-phase, 4-wire underground feeder in conduit to a Main Distribution Panel (MDP)/Panelboard located in the electrical room. Main facility feeder and main distribution panel shall be sized to have a minimum of 25% spare capacity at the end of the project above the estimated maximum demand for the building. Design of the exterior secondary electrical system shall be in accordance with Electrical Distribution System, Underground - SECTION 16375A and the requirements of this section. See paragraph Equipment Sizing Requirements and Ratings.

#### 1.5.1 Underground Service Entrance/Feeder/Branch Circuits.

Service entrance conductors, branch and feeder circuits shall be single conductor conductors, Type THWN or USE in accordance with NFPA 70. Service entrance conductors and underground feeder/branch circuits shall be copper conductors with insulating grounding conductor in conduit. Aluminum conductors and direct buried cables are NOT acceptable.

##### 1.5.1.1 Conduits

Conduits shall be pvc coated rigid steel meeting NEMA RN-1 within 1524mm (5') of the building foundations and schedule 80 PVC elsewhere. Conduits shall be non-encased direct-burial for low voltage circuits. Top of conduit shall be 609.6mm (24") below finished grade.

Control Tower chase space shall have the following 103 mm (4 inch) ducts.

- a. Provide number of ducts needed for the Control Tower Power.
- b. Provide a spare duct following the same route as the power ducts.
- c. Provide two empty ducts which are stubbed out beyond the extend of the concrete around the tower base, sealed and capped.
- d. The total number of ducts from a, b, c above shall be a least six. Additional ducts required to meet the total of six but not used under a and b shall comply with the stub-out requirements of c above.

In addition to the ducts provide all properly sized required conduits for all other systems used in the Control Tower addressed elsewhere.

#### 1.6 EXTERIOR LIGHTING SYSTEM.

Area lighting shall be provided for all walkways, above all exit doors, and area signage. Luminaires (light fixtures) shall utilize metal halide lamps. Exterior lighting system design shall be closely coordinated with the USER for height and aiming restrictions to avoid interference with the operation of the airfield and to ensure glare is not an issue with any operation of the control tower or aircraft. The normal operation for the control tower is sunrise to sunset. Design shall be in accordance with IES Handbook, Exterior Lighting Specification SECTION 16528A, Electrical Distribution System, Underground Specification SECTION 16375A, and the requirements in this section. All lighting design shall comply with IES handbook requirements.

##### 1.6.1 Area Lighting

Bollard light fixtures shall be provided along pathways at the Control Tower and the Control Tower Support Facility. Bollard lighting shall be in keeping with the architectural theme and the style shall be approved by the User. Light levels for the parking lot shall be average maintained 5 lux/0.5 fc measured at 152.4mm (6") above finished grade. Area lighting contactors and controls for the building shall be installed in the electrical rooms. Exact location of lighting controls shall be coordinated with the USER during the design of the project.

Provide lighting for the sailplane hangar display. The lighting shall be designed in accordance with IES Handbook and shall be metal halide.

##### 1.6.1.1 Exterior Building Lighting

Exterior building luminaires (light fixtures) for general security by doors shall be metal halide and sized to meet the lighting criteria and the most economical installation. Fixture(s) shall be mounted at each entrance for the building. Exterior building luminaires (light fixtures) located in eaves shall be compact fluorescent. Reference paragraph "Lighting Control" below. Building entrances shall be lighted to 21 lux (2 foot-candles).

#### 1.6.1.2 Control Tower Facade Lighting

The Control Tower will be visible from the interstate. The exterior facade of the control tower shall be lit from either the ground and/or from the supporting legs. Use metal halide lighting.

#### 1.6.1.3 Obstruction Lighting

Obstruction lighting shall be provided on the antenna towers and the Control Tower IAW AFI 32-1044.

#### 1.6.2 Lighting Control

Provide disconnect switch with HAND-OFF-AUTOMATIC switch and lighting contactors for exterior lighting controls. Lighting contactors shall be controlled from photocell connected through the automatic leg of the HOA switches. Time clocks shall not be used to control lights. Install lighting controls in the electrical room or otherwise indicated in this section. Lighting controls installed outside the electrical rooms shall be in weatherproof enclosures. Exact location of all lighting controls shall be verified with the USER during design of the project. Each specific type of exterior lighting shall have the ability to be controlled individually. This includes the sailplane static display lighting, the building exterior, bollard lighting, obstruction lighting, and the control tower facade.

#### 1.6.3 Underground Lighting Circuits

Provide underground branch circuits for all exterior lighting circuits. Branch circuits shall be insulated copper conductors with insulated grounding conductor in conduit. Aluminum conductors are NOT acceptable. Direct buried conductors are NOT acceptable. Underground lighting conductors shall be in rigid galvanized steel (RGS) conduit within 1524mm (5') of the building foundations and schedule 80 PVC elsewhere. Top of conduit shall be 609.6mm (24") below finished grade.

##### 1.6.3.1 Lighting Pole Grounding

All exterior bollards shall be grounded at the base of the pole. Provide a 19.05mm (3/4") x 3048.0mm (10 feet) copper clad grounding rod at each pole.

##### 1.6.3.2 Conductors

Cables shall be type USE conforming to UL 854, with copper conductors and type RHW or XHHW insulation conforming to UL 44, and shall include green ground conductor. Cable shall be provided with insulation of a thickness not less than that given in TABLE 15.1 of UL 854. Cable shall be rated for 600 volts. Parts of the cable system such as splices and terminations shall be rated not less than 600 volts. Conductors larger than No. 9 AWG shall be stranded.

##### 1.6.3.3 Conduits



Conduits shall be single, round-bore type, with wall thickness and fittings suitable for the application. Conduits shall be non-encased direct-burial, thick wall for low voltage lighting circuits.

#### 1.6.4 Building Lighting Circuits

All exterior luminaires (light fixtures) mounted on the surface of the building shall be wired from within the building and shall conform to the Interior Wiring Methods paragraph of this section. Building lighting circuits shall not be surface mounted.

### 1.7 CATHODIC PROTECTION SYSTEM

A sacrificial anode cathodic protection system shall be provided for all underground metallic lines (including sewer, water, gas lines), fittings, valves and fire hydrants. If underground lines are non-metallic, then all associated metallic fittings, valves, hydrants, etc. shall be protected. A dedicated galvanic anode shall be used for each fitting, valve, hydrant, etc. All galvanic anodes shall be connected to the structure through a test station. Conductors shall be exothermically welded to the structure. At least one test station shall be provided on each valve, fire hydrant and metallic pipe. Isolate all new piping from existing piping. All insulated flanges or couplings, if not accessible, shall have a test station which is connected to either side of the insulated flange or coupling. All connections to structures shall be done with two conductors: one is the active conductor and one is a spare. A conductor color coding system shall be used: black for anode, red for main structure, blue for reference cell, and white for a second structure. Beside color coding provide plastic tags on the terminal or cable. Each test station shall be provided with a unique identification number on the drawings for future reference. In addition, all metallic pipes must be provided with a coating system. The cathodic protection system shall be designed for a life of 25 years, use two bonds across each ductile iron pipe joint, use a current density of 2.0 mA/sq-ft), and use 10% for the amount of bare metal at end of the life. The typical soil resistivity in the area is between 2,000 ohm-cm and 20,000 ohm-cm. Contractor shall verify the soil resistivity by taking a minimum of three 4-pin readings in the area. The reading shall be taken for the depth of the pipe(s) and shall be averaged. The highest quality magnesium anode shall be used. Criteria for determining the adequacy of protection shall be in accordance with NACE RP-01-69 and shall be selected by the corrosion engineer as applicable. Design shall be in accordance with Cathodic Protection System, (Sacrificial Anode) - Specification SECTION 13110A and the requirements of this section. Test stations shall be flush-curb box mounted in 1' X 1' concrete pads. Anode wires shall be #12 AWG.

#### 1.7.1 Test Stations

The sacrificial anodes shall be connected to the structure through test stations. Provide other test stations as required in SECTION 13110A.

#### 1.7.2 Reference Cells

Permanent reference cells shall be located a minimum of every 152 meters (500 feet).

### 1.8 UNDERGROUND CABLE MARKINGS

A color-coded plastic warning tape shall be place at least 101.6mm (4")

wide within the trench above all buried utility lines. RED shall be supplied for the buried electrical lines and ORANGE shall be supplied for all the buried communication lines and YELLOW can be used for cathodic protection cables. In addition to the tape, a tracer wire shall be placed in the trench approximately 101.6mm (4") above the cable or duct.

#### 1.9 INTERIOR ELECTRICAL DISTRIBUTION SYSTEM

The interior secondary distribution voltage within the building shall be 480Y/277 volt, 3-phase, 4-wire for lighting and large loads and 208/120 volt, 3-phase, 4-wire for receptacles and smaller loads. Aluminum is not acceptable. The minimum branch circuit size shall be #12 AWG. The higher voltage (480 volts) shall be used for larger motor loads, equipment loads and all other required loads. The lower voltage (277 volts) shall be used for all the lighting loads. Provide step down transformers for all receptacle loads, small motor loads, computer loads, and all other loads as required. Step down transformers shall have a 20% spare capacity for future loads. Transformer windings and conductors shall be copper. Aluminum is not acceptable. Transformers that serve non-linear loads such as the computer receptacles shall have K-rated transformers. Contractor shall provide the most economical secondary system to meet the requirements of this section. Design shall be in accordance with Electrical Work, Interior - Specification SECTION 16415A, AFJMAN 32-1083, NFPA 70, and the requirements of this section.

Critical-Technical and Technical Power loads in the Control Tower and Control Tower Support Facility are to be on panels separate from general loads.

##### 1.9.1 Service Equipment

Service equipment/disconnecting means shall be provided in the Main Distribution Panel (MDP)/Panelboard/(s) located in the electrical rooms. Service equipment/disconnecting means shall be wall mounted. Service disconnect means shall be of the power circuit breaker or insulated-case circuit breaker type. Secondary surge protection shall be provided at the Main Distribution Panel.

##### 1.9.1.1 Main Distribution Panel (MDP)/Panelboard(s)

Main Distribution Panel (MDP)/panelboard(s) shall be in a metal-enclosure. Service disconnect circuit breaker shall be of the power circuit breaker or insulated-case circuit breaker type. Branch and feeder circuit breakers shall be molded-case type circuit breakers, except that branch and feeder circuit breakers with 200 amp trip and larger shall be insulated-case type.

Thermal-magnetic breakers larger than 150 amps shall have the instantaneous magnetic trip adjustable. Enclosure shall be ventilated general purpose type wall mounted type. Busses for the Main Distribution Panel (MDP) and all panelboard/(s) shall be copper only. Aluminum shall not be allowed. Each phase, neutral and equipment grounding bus shall be clearly shown on the drawings. Short circuit rating of all busses shall be clearly indicated on the drawings.

##### 1.9.1.2 KWHR Meter

Metering shall comply with Engineering Technical Letter (ETL) 94-2: Utility Meters in New and Renovated Facilities. KWHR meters with 15 minute demand registers shall be provided for recording power consumption of the facility and shall also record maximum demand and power factor for each phase.

Meters shall be provided with pulse initiators for connection to the BASE EMCS - (Energy Monitoring and Control System). Meter shall have tele-metering capability. KWHR meters shall also comply with the requirements of Colorado Springs electric utilities.

#### 1.9.1.3 Protective Coordination Study

A protective coordination study to include overcurrent and short current analysis shall be done on the electrical distribution system for the Control Tower/Control Tower Support building #9231. The study shall include the overcurrent and short circuit protection for the generator, service transformer, main switchboard disconnect, and any breaker which has an overload rating of 50% or more of what the rating is for the main service disconnect. The new GATR building shall have a short circuit calculations performed. Use infinite bus for the short circuit.

#### 1.9.1.4 Power Factor

Utilization equipment greater than 2000 watts with the power factor less than 95% shall be corrected to 95% lag power factor.

#### 1.9.2 Panelboards

Lighting and appliance branch-circuit panelboards shall be of the circuit breaker conforming to NEMA AB-1 and UL 489 and shall be located in the electrical room. Thermal-magnetic breakers larger than 150 amps shall have the instantaneous magnetic trip adjustable.

a. Load-center type panelboards shall be allowed at the GATR Building and in the Control Cab.

b. Panelboard shall not exceed 1981.2mm (78") in height from the finished floor. The height of the panelboard in the Control Cab shall be coordinated to not block the view out of the Cab. This may require lower height panelboard or special consideration in location.

c. All panelboards shall have a minimum of 25 percent spare capacity for all loads at the end of the project.. Panelboards shall have a minimum of 25 percent spare circuit breakers. Spare circuit breakers shall be redundant of the type of circuit breaker being provided in the panelboard.

d. Panelboard busses shall be copper only. Aluminum busses are not acceptable.

e. The phase loading on panelboards shall be balanced as much as practical by the type of loads on the panel. This includes equally disbursing the spares between the phases.

f. All panelboards shall be provided with a panel schedule which is typed and placed in a protective holder located on the front inside of the panelboard door.

g. A 100 amp panelboard shall be located in the Control Cab 601. The panelboard shall have 25% spare breakers provided. The panelboard shall be 120/208VAC. A minimum of six circuits shall terminate in quad receptacles as required in the Control Tower Design Guide. Enhanced Terminal Voice Switch (ETVS) furnished and installed by others requires a 2-pole, 30 amp circuit. See sheet A1.2 for quantity of ETVS units.

h. A 100 amp panelboard shall be located in Room 121/123. The panelboard shall be 120/208VAC.

#### 1.9.3 Motors

Motors shall be of sufficient size for the duty to be performed and shall not exceed the full-loading rating when the driven equipment is operating at specified capacity under the most severe conditions encountered.

a. All motors shall have open frames and continuous-duty classification and be based on a 40 degree C ambient temperature reference.

b. All motors shall be derated for altitude - 2184 meters (7166').

c. All permanently wired polyphase motors of 747 watts or more shall meet the minimum full-load efficiencies as indicated in the Electrical Work, Interior Specification SECTION 16415A.

d. Power factor correction capacitors are to be installed with individual motors 25 HP and larger as a minimum, unless the motor is controlled by a variable frequency drive (VFD). In the case of VFD, capacitors are not required.

e. Motor starters shall use circuit breakers instead of fuses.

f. Thermal overloads shall be the bimetallic type that can be reset. The magnetic overload option shall only be used if indicated by the manufacturer of the equipment.

g. Reduced voltage starters shall be used on motors which are 50 Hp or larger as a minimum.

h. Motors above 1 HP shall be high efficiency.

i. All three-phase motors shall have phase loss protection.

j. VFDs shall be provided with manual by-pass switches.

#### 1.9.4 General Purpose Receptacles

Duplex receptacles for general purpose applications shall be 20 amp, 125 volt, 2-pole, 3-wire grounding type. A maximum of six duplex receptacles may be connected to a receptacle circuit. Receptacle circuits shall not supply lighting loads. Receptacles shall be installed to have the ground below the power/neutral blades. General purpose duplex receptacles shall be located in the facility as follows:

a. Provide general duplex receptacles every 3.65 meters (10') along the walls in all areas of the building. For small rooms that do not have 3.65 meter (10') walls, a minimum of one (1) outlet shall be installed on each wall. Receptacles shall be mounted 381mm (15") above finished floor, unless otherwise indicated or required. In addition, the location of the outlets shall be coordinated with the interior design package (furniture layout) to ensure proper placement.

b. Provide a general purpose duplex receptacle adjacent to each mirror for each sink position located in the bathrooms. Where mirrors are located other than above sinks, provide additional receptacles to

accommodate hair dryers. Receptacles shall have (GFI) ground fault interrupters. Mount receptacles 1219.2mm (48") above finished floor.

#### 1.9.5 Special Receptacles

Ground Fault Interrupter (GFI) receptacles shall be provided in all rest rooms, sink countertops, janitor's closets, exterior of the facility and any other wet locations. Weatherproof receptacles for exterior use, shall be mounted in a box with a gasketed, weatherproof, cast-metal cover plate and gasketed cap over each receptacle opening with (GFI). Exact location of the receptacles noted below shall be coordinated with the USER during the design of this project. Provide 20 amp, 125 volt, 2-pole, 3-wire grounding type, duplex receptacles in the following locations:

- a. Provide a duplex receptacle for each electric water cooler.
- b. Provide dedicated duplex receptacles for the government furnished and government installed copier and fax machine.
- c. Provide a duplex weatherproof receptacle with ground fault interrupter on the exterior of the building adjacent to each exit door of the building. There shall be at least one receptacle per main exterior wall. Mount receptacles 609.6mm (24") above finished grade.
- d. Provide two (2) duplex outlets every 1828.8mm (72") along each wall in the Telecommunications Room 122, 123 Telephone Maintenance and GATR 101 Radio Equipment, but there shall be at least three duplex outlets along each wall. Outlets shall be 20A, 125 volt, duplex outlets with dedicated branch circuits. Three dedicated circuits shall be used in the Telephone Equipment Room 122. GATR Room 101 shall use a minimum of four circuits. Receptacles shall be installed 381mm (15") above finished floor.
- e. Provide one (1) dedicated 20 amp, 125 volt duplex receptacle for each EMCS OR DCC panel. Each receptacle provided for the EMCS panels shall have a dedicated branch circuit.
- f. Provide one (1) dedicated 20 amp, 125 volt duplex receptacle for each LAN rack. Each receptacle provided for a LAN rack shall have a dedicated branch circuit and ground.
- g. Provide a dedicated quadraplex receptacle in Control Tower Elevator Lobby 301. It shall be located on same wall as the plywood telephone backboard.
- h. Break Room 133 provide a receptacle at the height necessary to easily plug in the ceiling mounted TV.
- i. Overhead projectors in Room 113, 105 and 4th Floor Observation Deck 401 shall require a ceiling mounted receptacle for power. The device plate and receptacle body shall match the ceiling color.
- j. Control Cab 601, see floor plan. Each position shall have a pair of electrical outlets (quad receptacles). A minimum of one circuit breaker (20 amp, 120V) shall be used for each position.

#### 1.9.6 Computer Outlets

Computer outlets shall be duplex, 20 amp, 125 volt, 2-pole, 3-wire grounding type receptacles. A maximum of three duplex computer outlets

shall be connected to a branch circuit. Circuits shall be sized using 600 volt-amp per computer. Neutral conductors shall be sized at 133% of the phase conductors. Computer outlets shall be labeled as "COMPUTER". Mount the outlets 381mm (15") above finished floor. Computer outlets shall be mounted near the Telephone/Data outlets. Maintain a separation of at least 152.4mm (6") from the Telephone/Data outlets. Exact location of all Computer Outlets shall be verified and coordinated with the USER during the design of the project. Location of outlets shall be coordinated with the interior design package to include the furniture layout. Contractor shall either place all computer outlets on one panel which has TVSS or shall provide outlets which have a built-in TVSS.

#### 1.9.7 Device Plates

Device plates shall be stainless steel in areas with finished walls. In areas with unfinished walls like mechanical walls, the device plate shall be stainless steel. The receptacle body and light switches shall be gray in color.

#### 1.9.8 Other Loads

Designer of Record shall coordinate with SECTION 01003 and with SECTION 01006. The anticipated loading and power configuration for some items was provided, but the Designer of Record is still responsible for the final coordination with the actual equipment installed. Contractor shall provide electrical power to the following loads either by receptacle or direct wired as applicable. If the item is an option and the option is not exercised, the receptacle or a junction box with wire for future connection shall be provided.

One ceiling mounted retracting video projector mount shall be located in Room 113. See SECTION 01003. Place controls at switch height near the front of the room.

One ceiling mounted motorized projection screen shall be located in Rooms 105 and 113. See SECTION 01003. Locate controls at switch height near the screen.

One ceiling mounted retracting video projector mount shall be located in Room 105. See SECTION 01003. The unit shall be able to be controlled by someone at the podium. Provide necessary in-floor jacks.

Instantaneous electric water heater used in cab sink.

Electric drapes located in Control Tower 401. Means to open and close.

Equipment to be placed in the GATR Building by others shall have the necessary circuits and receptacles available for them:

GRT-21/22 Transmitters, total 21: 140 watts per transmitter; 478 BTU/hr heat emission per transmitter.

GRR-23/24 Receivers, total 20: 50 watts per receiver; 171 BTU/hr heat emission per receiver.

Bridging Amplifier Cards, total 6: 5 watts each power supply for the cards, power consumption total is 55 watts.

Provide dedicated a dedicated power circuit(s) for the HVAC control panels.

#### 1.9.9 Architectural/Mechanical Connections

Contractor shall provide branch circuits, disconnect switches, magnetic starters, and all other related electrical equipment and material for all architectural, mechanical equipment and environmental equipment to be installed in the project (includes the facility and site). This shall include all hand dryers, HVAC units, unit heaters, pumps, exhaust fans, and all other mechanical equipment in the facility. Contractor shall coordinate this electrical requirement with the architectural and mechanical requirements.

1.9.10 Not Used

1.9.11 Emergency Power

Emergency power units shall be based upon the EMD as calculated in SECTION 01336 plus any other requirements given for the specific emergency power unit.

1.9.11.1 Emergency Standby Generator

(1) Control Tower Site

The requirements given herein shall be coordinated with the requirements given in SECTION 01006 paragraph Emergency Generator and IEEE 466. In addition, derate the generator for altitude.

Contractor shall provide a Class C diesel generator and associated automatic transfer switch with by-pass/isolation capability for maintenance and with capability to supply power to meet the estimated maximum demand (EMD) of the facility plus 25% spare capacity at 0.8 power factor. The percentage of non-linear loads shall be taken into account and if determined greater than 25%, then the non-linear loading must be used in determining the size of the unit. The emergency generator shall be a skid mounted and located inside Room 108. Provide a ground rod by the frame. The emergency generator shall meet the requirements herein and UFGS 16263A or 16264A as applicable. The automatic transfer switch shall meet the requirements given herein and UFGS 16410A. The use of a switched three-pole or four-pole shall be coordinated with how the Designer of Record treats the emergency generator i.e. separately derived system or not a separately derived system. The generator shall be located in the Generator Room 108. The following areas and loads shall be on generator back-up:

The entire facility shall be on generator power including the fire water pump, if a fire pump is determined necessary.

- a. Unit shall have a maximum speed of 1800 rpm.
- b. Droop governor with 3% frequency regulation.
- c. Voltage bandwidth at steady state shall be 2%.
- d. Unit shall be for 60 Hz, 3 phase, 4-wire.
- e. Maximum load increase is 100% at 0.8 power factor.
- f. Frequency bandwidth shall be 0.25%.
- g. Electric starting where the batteries recharge in 24 hours.
- h. Class F insulation.
- i. Provide output breaker located with or adjacent to the unit.
- j. Alarms shall be provided as required for Level 2 in NFPA 110.
- k. The unit shall start within 10 seconds after a power outage.

- l. Maximum voltage deviation shall be 10%.
- m. Maximum frequency deviation shall be 5%.
- n. Recovery time back to bandwidth from a 100% block change in load shall be 15 seconds.
- o. A remote annunciator shall be located in the Control Cab 601 in accordance with Air Traffic Control Tower Design Guide.
- p. Provide a two day fuel tank.
- q. Provide a 0-2 hour adjustable timer per Air Traffic Control Tower Design Guide.

(2) GATR Site

The requirements given herein shall be coordinated with the requirements given in SECTION 01006 paragraph Emergency Generator. The entire GATR building shall be on emergency generator back-up. In addition, derate the generator for altitude.

Contractor shall provide a generator and associated automatic transfer switch with by-pass/isolation capability for maintenance and with capability to supply power to meet the estimated maximum demand (EMD) of the facility plus 25% spare capacity at 0.8 power factor. The percentage of non-linear loads shall be taken into account and if determined greater than 25%, then the non-linear loading must be used in determining the size of the unit. The emergency generator shall be a skid mounted device and shall be located inside Room 105. Provide a ground rod near the unit to connect to the frame. In addition to the proper grounding of the generator, the associated fuel tank shall be bonded to the same ground. The emergency generator shall meet the requirements herein and UFGS 16263 or 16264 as applicable. The automatic transfer switch shall meet the requirements given herein and UFGS 16410. The use of a switched neutral shall be coordinated with how the Designer of Record treats the emergency generator i.e. separately derived system or not a separately derived system. The entire GATR facility shall be on generator back-up.

- a. Unit shall have a maximum speed of 1800 rpm.
- b. Droop governor with 3% frequency regulation.
- c. Voltage bandwidth at steady state shall be 2%.
- d. Unit shall be for 60 Hz, 3 phase, 4-wire.
- e. Maximum load increase is 100% at 0.8 power factor.
- f. Frequency bandwidth shall be 0.25%.
- g. Electric starting where the batteries recharge in 24 hours.
- h. Class F insulation.
- i. Provide output breaker located with or adjacent to the unit.
- j. Alarms shall be provided as required for Level 2 in NFPA 110.
- k. The unit shall start within 10 seconds after a power outage.
- l. Maximum voltage deviation shall be 10%.
- m. Maximum frequency deviation shall be 5%.
- n. Recovery time back to bandwidth from a 100% block change in load shall be 15 seconds.

1.9.12 Elevator

Coordinate with Sections 01003 and 01006 for requirements. Electrical wiring requirements, receptacle type and location, etc. shall comply with ASME A17.1 and the National Electric Code (NEC), Article 620. Wire size - #18 AWG shall be allowed for control and signal, and #14 AWG shall be allowed for power and lighting IF needed for flexibility; otherwise #12 AWG shall be the minimum. Circuiting and receptacle requirements shall meet



the requirements in the NEC.

#### 1.10 INTERIOR LIGHTING SYSTEM

The interior design shall be in accordance with the requirements in this section, the IES Handbook, the "Electrical Work, Interior" Specification - SECTION 16415A, and the requirements in this section. The Corps of Engineers Standard light fixture details are 40-06-04, dated Oct. 1997 and should be consulted when picking out fixtures.

##### 1.10.1 Illumination Levels

Maintained illumination levels shall generally not be less than the values listed in the table below. The maintained illumination levels are calculated to desk/table height in offices, bedrooms, alarm room, and dining room. Equipment, mechanical, electrical, communication rooms, and corridors shall have the maintained illumination level calculated to floor level.

ROOM TYPE	INTENSITY lux/(fc)
Corridors	160/15
Communications Room	325/30
Electrical Room	325/30
Janitor Closet	55/5
Lobby	215/20
Locker Rooms	325/30
Toilets	325/30
Mechanical Rooms	325/30
Offices Areas	540/50
Briefing	540/50
Stairways	160/15
Storage/Supply Rooms	216/20
Vestibule	160/15
Classroom/Conference Rooms	540/50
Copier/Vending Area	215/20
Control Cab Room	325/30

##### 1.10.2 Conservation Requirements

Illumination levels, in conjunction with energy conservation, shall be obtained by the most life cycle cost-effective techniques including, but not limited to, the following:

a. Provide multiple switching of multi lamp fixtures or multiple switching of fixture groups in large rooms, or both, to permit lighting fixtures to be turned off in unoccupied areas. Note that a switch shall be allowed to only control lighting within a single room.

b. Provide energy efficient lamps and solid-state electronic ballasts.

c. Occupancy sensors shall be used for locations such as conference rooms, briefing rooms, janitor closets, and toilets, where use would be intermittent and where control would generally be accessible to several individuals or functions. Passive configurations such as infrared sensors are to be used, unless the application is better suited to ultrasonic.

d. Location of light switches shall be coordinated with the floor plan and furniture layout to ensure that they are easily accessible and convenient. Location shall be coordinated with the User.

#### 1.10.3 Fluorescent Luminaires (fixtures)

Fluorescent light fixtures with T8, 32 watt lamps shall be used in all areas of the building. Fluorescent lamps shall have a color temperature of 3000 degrees Kelvin, color rendering index of 80 or more and an initial lumen output of at least 2900. Fluorescent light fixtures in offices and related areas shall use 3 lamps and shall be deep 9-cell parabolic fixture.

Offices and Briefing rooms shall be provided with multi-level switching (0%-33%-66%-100%). Fixtures in other areas such corridors, restrooms, lobby, storage/laundry, etc. shall be 2 or 3 lamp fluorescent type fixtures. Acrylic lenses on fluorescent fixtures may be used in restrooms, showers, etc., where fixtures are subject to damp atmospheres or where added protection for the lamps may be required. Fixtures in utility areas such mechanical rooms, electrical/communications room, storage rooms, and janitor's closet shall be industrial fluorescent type fixtures with open reflectors. Lamps in open industrial fixtures shall have protective tubes installed over the lamps. All ballasts shall be of the energy saving electronic type with power factor correction to exceed 90%. Low mercury "green type" fluorescent, compact-fluorescent, metal halide, and high pressure sodium lamps/bulbs shall be installed when available in the proper size and type for the application. Ballasts shall have a total harmonic distortion (THD) less than or equal to 10% and shall operate at a frequency range of 25k -33k Hz. Dimmable lighting can consist of dimmable compact fluorescent light fixtures instead of incandescent.

Fluorescent fixtures used in Electronics Room 121, Telephone Equipment Room 122, Radio Maintenance Room 123, Control Cab Room 601 and the GATR Bldg. shall use ballasts which have appropriate filtering to reduce RFI and EMI emission so as not to interfere with electronic equipment.

Use hard metric fixture sizes for lay-in type when using a hard metric ceiling grid. Common fixture sizes are 600 by 600 mm and 600 by 1200 mm; however, the 600mm by 600mm shall be used only when the 600mm by 1200mm cannot be used or specifically approved by the Base. The hard metric fixtures are manufactured to accommodate the 609 mm (24-inch) and 1218 mm (48-inch) length tube. Because of the tube length, some metric fixtures cannot be laid out in continuous row configurations. Designer must verify restriction on metric fixture layouts with manufacturers.

#### 1.10.4 Incandescent Luminaires (fixtures).

Incandescent lighting fixtures shall not be used, except in the Control Cab 601 and other areas which require special dimming.

#### 1.10.5 Egress and Exit Lighting Luminaires

Egress and exit lighting design shall be in accordance with NFPA 101 and ETL 94-5. Exit lights shall be LED type. Egress and exit luminaires shall be on emergency generator back-up. Exit luminaires shall also be provided with battery back-up. Egress luminaires located in the Control Tower stairs and in each Control Tower room shall have battery back-up. In the Control Tower Support Facility, luminaires with battery back-up shall be provided in the Corridors, 134 Logger Room, Rooms 121 and 123, 114 Open Office, 105 Briefing Room and 133 Break Room and the fixture nearest the main electrical service panel. Battery powered wall-packs are

prohibited.

#### 1.10.6 Briefing Room(s)

The Briefing rooms shall have multilevel and dimmable lighting to allow audio/visual equipment to be used and still take notes.

Briefing Room 105 room does not have a ceiling, but will be open to the structure above. Provide appropriate lighting that reflects a high tech look.

#### 1.10.7 Indirect Lighting

In addition to the overhead direct lighting, provide indirect lighting along the walls in Lobby 102, Office 109, 110, and 114.

#### 1.10.8 Undercounter Lighting

Provide fluorescent undercounter lighting in areas with cabinets and counters.

#### 1.10.9 Control Cab 601

The entire ceiling in the Control Cab shall be painted black. Provide light fixtures that have black housings.

Provide dimmer panel for the lights and a light layout that meets the Air Traffic Control Tower Design Guide. All light fixtures located in the Control Cab 601 shall be incandescent type, except for the maintenance lights. Track lighting shall be used. Locate the lights to have them aimed away from the glass, while still lighting the workstation surface.

In addition to the lights required for the operation of the Control Cab 601, provide some lights which are for maintenance. The maintenance lights shall be switched independently from any other lights in the cab. These lights can either be incandescent or fluorescent.

### 1.11 EXTERIOR COMMUNICATION DISTRIBUTION SYSTEM

This design shall be in accordance with the Telephone System, Outside Plant Specification SECTION 16711A, Electrical Distribution System, Underground Specification SECTION 16375A, Appendix C of the Base Standards found in Attachment No. 5 of the RFP, and applicable TIA/EIA standards listed at the front, and the requirements of this section. See manhole and duct details in Attachment 2C. See approximate routing on photo overlay in Attachment 2C. For Information Only drawings provided in drawing package show approximate routing of existing utilities. This information shall be field verified. Exterior communication cables are not part of this contract and provided and installed by others. Placement of manholes and routing of duct bank shall be approved during the review process.

#### 1.11.1 Control Tower and Control Tower Support Facility

A new communication manhole ductbank system is required to support this facility. The system shall start by connecting to existing manhole FL-6 (old number is AF-6). The ductbanks and manholes shall run to the new Control Tower site by taking the same route as the existing power manhole system. Provide four 103mm (4") ducts, thickwall for direct burial. See Attachment 2C for details to be followed for the communication manholes and

ducts. See Attachment 2C for approximate routing of the communication manhole/duct bank system.

Provide a communications manhole near the control tower. Manhole shall be a large communications type which is at least 2438 mm (8 ft) deep. The manhole shall have three (3) 103mm (4 inch) ducts which extend to 122 Telephone Equipment Room and four (4) 103mm (4 inch) ducts to the 121 Electronics Room.

Control Tower chase space shall have the following 103 mm (4 inch) ducts. Inner duct shall be provided when required by the User.

- a. Provide two from the chase to the Telephone Equipment Room, 122.
- b. Provide four from the chase to the Radio Maintenance, 123.
- c. Provide one stubbed out beyond the limits of the concrete around the tower base, capped and sealed. Provide an unobtrusive means to mark location of duct end.
- d. Provide six ducts to the communication manhole.

In addition, provide two 53mm (2 inch) conduits which extend toward Taxiway H. Stub out beyond the limits of the concrete around the tower base and cap and seal. Provide an unobtrusive means to mark location of conduit ends.

In addition to the ducts provide all properly sized required conduits for all other systems used in the Control Tower addressed elsewhere.

#### 1.11.2 GATR Building

The GATR Building shall be connected to an existing manhole located west of the site across the street. Run eight (8) 103mm (4 inch) ducts which extend to GATR Building from manhole. The manhole is FL-12 (old AF-12).

#### 1.11.3 Communications Ductbank/Manholes

Minimum burial depth shall be 1066.8mm (3'-6") below finished grade. Contractor shall either bore or push communications conduits under roadways. Roadways shall NOT be cut for new duct bank crossing. Each manhole shall have mounting hardware to support the cable. The hardware shall be grounded to the grounded conductor if metallic. Non metallic hardware is preferred. The manholes will be grounded in accordance with IEEE C2. Duct banks which cross under taxiways shall be rigid steel or placed in steel carrier pipe.

New manholes shall be provided at 90 degree turns and outside the facility as a minimum. Distance between manholes shall not exceed 100 meters (300 feet) and not more than 360 degrees of total bend. Vertical bends into equipment pads must be counted in determining the total bend. Also risers shall be located not more than 46 meters (150 feet) from manholes. Provide an analysis with calculations and pulling criteria if these limits are exceeded.

#### 1.12 INTERIOR COMMUNICATION SYSTEM

The telecommunications (telephone) system design shall comply with NEC Article 800, Corps of Engineers specifications, TIA/EIA 568A, 569, 607, and Appendix C of the Base Standards found in Attachment No. 5 of the RFP and other applicable regulations. The exception to Attachment No. 5 is that the wiring shall be Category 5E for the data and LAN cables. The design shall form a complete communications system, including, but not limited to:

wires, terminations, raceway, cabinets, and outlets, as determined by the criteria for each project. All wiring shall be tested.

All interior communication wiring systems shall have the cabling labeled with a unique alpha-numeric number at beginning and end termination points of the cable. This alpha-numeric number shall also be used placed by the jack on the device plate. The alpha-numeric number shall be derived from the room number and jack number. The jack number shall use "V" for voice and "D" for data.

The wiring between jacks and the termination points shall be in conduit. The conduit size shall be 21mm (3/4 inch) for 8-pair and 16-pair cables; 27 mm (1 inch) for 24-pair; 35 mm (1-1/4 inch) for 32-pair.

Ladder trays shall be provided in the ceiling area above the cabinets and wall mounted cross connect blocks in the Telephone Equipment Room 122. Sizing shall include the 20% spare capacity.

Provide vertical tray in the Control Tower vertical chase. Sizing shall include the 20% spare capacity.

A record of all communication wiring installed by this contract shall be provided in a Windows based cable management software along with a hard copy of the printout. A licensed copy of the cable management software shall be provided to base through the Contacting Officer.

#### 1.12.1 General

All electronic devices (computers, file servers, hubs, concentrators, phones, etc.) are not part of this contract and will be installed by the USER or a representative of the User. Each facility design shall be in accordance with Premises Distribution System Specification - SECTION 16710A, Electrical Work, Interior Specification SECTION 16415A and the requirements of this section. Distance limitations for cabling lengths shall be in accordance with the TIA/EIA standards.

#### 1.12.2 Communication Terminal Backboard

Provide a 19.05mm (3/4") plywood backboard on all walls (floor to ceiling) in both the Telephone Equipment Room 122, the south wall of 121 Electronics, and one wall in 301 Elevator Lobby. In the GATR Bldg. plywood shall be placed on the west wall, southwest corner for telephone demarcation. The plywood telephone backboard shall be provided with a fire retardant coating. Contractor shall coordinate location of incoming telephone service with the location of the surge arrestors and cross connect blocks on the telephone backboard as defined in Attachment No. 5 of the RFP. All underground conduits entering the Communication Room shall be stubbed up 152.4mm (6") above finished floor adjacent to the telephone backboard. The equipment layout in the Communication Rooms shall be approved by United States Air Force Academy Communications Squadron (USAF 10 CS) or their representative.

#### 1.12.3 Telephone/Data Conductors/Conduits

Copper cables shall be 24 gauge, 4 pair, EIA-TIA 568B Category-5E, unshielded twisted pair (UTP), solid copper station cable for data cables. Voice cables shall meet all the same parameters as the data cables, but can be Category 3. The cables shall be plenum rated when not installed in conduit between the Communication Room and jack. Terminate cables on jacks with EIA 568B

sequencing. All telephone conductors shall be installed in conduits per Wiring Methods paragraph in this section. All cables including patch cords shall be U.L. tested at a minimum of 155 MHz operation. Extrapolation from a lower frequency is not allowed. The installation acceptance test shall be a "channel test" and includes all patch connections and cables. Cables are dedicated to one device/jack i.e. no daisy chaining.

#### 1.12.4 Telephone/Data Outlets

Provide a two jack outlet, unless indicated otherwise: one jack for telephone and one jack for Data (LAN), in a single-gang outlet junction box sized in accordance with UFGS 16710A. Each outlet shall be RJ-45, eight pin. Provide outlet junction box and 21 mm (3/4"C) from the junction box. The conduit shall terminate above the backboard or floor and the end of the conduit shall have a chase nipple installed. Telephone and data (LAN) cables are not allowed to be visibly exposed along wall or ceilings except in the communications room. The tables below show the quantity and room location requirements for telephone and LAN (Data) outlets.

Each outlet shall be mounted 381mm (15") above finished floor, unless indicated otherwise. All Telephone/data outlets locations shall be coordinated with the interior design package to include the furniture layout. Locate jacks as required by the equipment and User. United States Air Force Academy Communications Squadron shall have final approval on the location of the outlets.

##### TELEPHONE OUTLET

Provide a single jack for these outlets.

ROOM	ROOM NAME	Number of Outlets
102	Lobby	1
119	Elevator Lobby	1**
133	Breakroom	1**
	Exterior of Vestibule	1*,**
601	Control Cab	6***

\*Provide weatherproof system for exterior wall phone by entrance

\*\*These outlets shall be mounted at 1219mm (48-inches) AFF for wall mounted type phones.

\*\*\*Locate jacks are required by the equipment and User.

##### TELEPHONE/LAN OUTLETS

These outlets consist of one jack for telephone and one jack for LAN (Data)

ROOM	ROOM NAME	Number of TELEPHONE/LAN Outlets
102	Lobby	1
104	Lobby	1
105	Briefing Room	4
106	Storage	1
107	Briefing Support	1
109	Office	2
110	Office	2
113	Conference Room	3*
114	Office Cubicles	1 for each cubicle
121	Electronics	2
123	Radio Maintenance	3
124	Office	2
125	Office	2
126	Flight Commander	3
131	Sub Briefing	2
132	Sub Briefing	2
133	Break Room	1

134	Logger Room	2**
135	Rope Room	1
Main Entrance w/ weatherproof Phone Enclosure		1
502	Observation	4

\*One set of outlets shall be a flush mounted box which has a duplex power outlets and a telephone/LAN outlet. The flush mounted box shall be located directly below the center of the conference table.

\*\*These outlets shall have one telephone jack and two LAN (Data) jacks.

#### LAN OUTLET

Provide a single jack for these outlets.

ROOM	ROOM NAME	Number of Outlets
114	Office Cubicles	3*
126	Cadet Flight Commander	2
131	Sub Briefing	2
132	Sub Briefing	2
601	Control Cab	**

\*Location to be provided by User. Outlet for printer or fax lines

\*\*See Architectural floor plan. Each position shall be provided with a LAN drop. Designer of Record shall coordinate the number of LAN outlets for the equipment. A minimum of 20 jacks shall be provided, this includes two located in the ceiling. Location as directed by User..

#### 1.12.5 Cross Connect Blocks.

Cross connect blocks shall be the Category 5E, 110 type. The telephone cross connect blocks shall have stand-off brackets and shall be wall mounted in Room 117. Each 4-pair telephone shall terminate on its own terminal on the 110 block. Provide the necessary quantity of blocks to accomplish this plus provide one additional block for future connections.

#### 1.12.6 Patch Panels

The LAN (Data) cables shall terminate on 24-port rack-mounted patch panels located in Room 122. The quantity shall be coordinated with the number of 4-pair cables required. Rack shall be provided with cable wireways on the sides and a multi-outlet surge-protector power strip located at the base.

#### 1.12.7 Antenna Towers

GATR Site. Install two (2) 30 m (100 ft) towers to replace removed antenna poles. New towers shall have climbing provisions, obstruction light(s) and lightning protection. Two known acceptable manufactures include Rohn Industries, Inc. (Contact Scott Wenk, 714-734-0987) and Glen Martin Engineering, Inc. (Tatum Martin, 660-882-2734). The towers shall be made of steel and free standing. Antennas to be placed on the towers shall be provided and installed by others. All requirements for the towers and associated equipment shall be coordinated with the USAF Academy 10th Communication Squadron. The towers shall be painted dark green, Pittsburgh Paints Copper Verde 7429 or approved equal. The north antenna tower shall be #10014 Antenna SPT STRU and the south antenna shall be #10015 Antenna SPT STRU. The towers shall be located a maximum of 12.1 meters (39.6 ft) from the GATR Building. Coordinate this requirement with the foundation requirement for the tower. The top of the tower shall have an antenna platform with guard rail in a triangular shape. Each side of the triangle is approximately 3660mm (12 ft) long. Cables (provided by others) are to be pulled up inside the antenna tower. Provide tower with climbing provisions. Tower shall meet the requirements of ANSI EIA/TIA 222-F. Tower shall be grounded in accordance with NFPA 780 and the antenna tower manufacturer recommendation.

There shall be four 103mm (4") ducts from each antenna tower to the GATR buildings. Ducts shall run from the center of the antenna tower foundation (coordinated with structural and manufacturer of tower), to the GATR Room 101.

#### 1.12.8 Other Communication Support

Provide penetrations in the raised floor in Control Cab Room 601. The penetrations shall require a grommet material on top and bottom of the penetrations to protect cables from being damaged.

Provide one-gun overhead projector wiring meeting the requirements in the Base Communication Standard in Attachment No. 5. In the Room 113, the overhead projector shall require wiring from it to jacks located on the wall near the front. Coordinate location with User.

Provide one-gun overhead projector wiring meeting the requirements in the Base Communication Standard in Attachment No. 5, in Room 105. In Room 105, the person at the podium shall be able to control the projector and its input. Provide floor mounted jacks near the podium location. The computer input to the overhead projector shall be located in Room 106. Provide all necessary jacks and wiring.

Provide one-gun overhead projector wiring meeting the requirements in the Base Communication Standard in Attachment No. 5 to the 4th Floor Observation Deck 401. Provide wall mounted outlets.

Provide a cable ladder in the vertical chase space in the Control Tower for communication cables and cable ladder in the vertical chase space for the power cables. The cable ladder shall have stand-offs to facilitate the installation of cables on the tray. Provide proper grounding of the cable tray. Appropriate shielding and/or separation is required between the communication, power and any any other systems which use the chase.

Intercom station shall be installed and provided at the main entrance to the Control Tower and at the door to the Control Cab. The intercom station shall be weatherproof if installed outside. The receiving end of the intercom shall be in the Control Cab 601 near the security monitor and door strike release switches. The system shall allow two-way communication. Coordinate with the Security System.

#### 1.13 PUBLIC ADDRESS (PA) SYSTEMS

There shall be two public address systems: one shall be controlled from the Control Tower Cab 601 and the other (Control Tower Support Facility) shall cover all remaining areas. The Control Cab 601 does not need speakers from the other pa system; however, a means to access the pa system and provide messages in a "ALL CALL" format shall be provided. The public address system shall have all conduit, junction boxes, and Category-5 shielded pair plenum wiring (24 AWG) for speakers, Category 5 110 blocks, speakers, grilles, amplifiers, etc. for a complete and usable public address system in accordance with the guidance herein and with the requirements given in UFGS 16770. The speaker cables shall terminate on cabinet-mounted 110 blocks located in Telephone Equipment Room 122. The quantity shall be coordinated with the number of cables required. Each speaker cable shall terminate on its own terminal at the 110 blocks. All power required for the system shall be supplied. Public address system cables are not allowed to be visibly exposed along wall or ceilings except



in the communications room. Provide a cabinet for the public address system equipment. The speakers with back boxes inside the facility are ceiling mounted in the ceiling tile. The public address system shall be connected to the telephone system. The system shall work by a person dialing an access number with the telephone and making the announcement with the telephone over the public address system. Provide all equipment necessary to make it a complete and operational system.

All interior communication wiring systems shall have the cabling labeled with a unique alpha-numeric number at beginning and end termination points of the cable. The rooms listed below shall be provided with the public address system speakers.

PA System for Control Tower Support Facility

ROOM	ROOM NAME
102	Lobby*
103	Corridor
105	Briefing Room*
107	Briefing Support Room/Storage*
109	Office*
110	Office*
113	Conference Room*
114	Open Office*
121	Electronics*
123	Radio Maintenance*
124	Office*
125	Office*
126	Flight Commander*
127	Women's Toilet
129	Men's Toilet
130	Corridor
131	Sub Briefing*
132	Sub Briefing*
133	Break Room*
134	Logger Room*
135	Rope Room*
401	Observation Area*

PA System for Control Tower, can only be accessed from the Control Tower Cab.

ROOM	ROOM NAME
502	Observation*

Exterior of Control Tower (Weatherproof horn type speaker, provide volume control located in Control Cab), locate on northwest side of control tower.

\*The speakers for these areas shall have wall mounted, volume control capabilities. The volume control unit shall be located by the door into the room. The volume control shall be able to shut-off the signal completely to the speakers.

1.14 SECURITY AND CLOSED CIRCUIT TELEVISION SYSTEMS

Closed circuit television system is required. Provide junction boxes, conduit, and wiring for the camera, monitor, cipher electronic lock, electric strike plate and flush mounted door speaker in accordance with the requirements herein and specification UFGS 16751. The main entrance to the Control Tower shall have a ceiling dome camera (weatherproof), located to view a person at the elevator lobby door from Lobby 104, which leads to the

Control Tower and there shall be a camera located outside the door of the stairs leading to the Control Cab Room 601 from the stair landing adjacent to Observation Deck Room 401. This person would activate an intercom which would "ring" directly into the Control Cab where the closed circuit television monitor is located (13" minimum black & white screen). The system shall either use a split screen or it shall cycle between the views.

The Control Cab room operator shall be able communicate over the intercom and be able to activate a switch to release the strike on the front door to let the person(s) into the facility. In addition, there shall be an electronic keypad located by the door, which is connected to the door electric strike. Conduit shall be a minimum size of 21 mm (3/4") galvanized, rigid steel conduit. Wiring, conduit and junction boxes for these systems shall be provided from the equipment location at the main entrance to the Control Cab Room 601. Provide a dedicated receptacle (duplex outlet) to power the camera and strike plate. The monitor shall be ceiling mounted in the Control Cab Room 601 at a location indicated by the User.

Provide empty conduit and junction boxes for the power and signal wiring for the following future future weatherproof camera location: Provisions for future shall be outside be Stair 120 on first floor. Also, provide empty conduit and junction boxes for the power and signal wiring for the following future future camera location: Provisions for future shall be at Landing 201 and Landing 301. The CCTV system control system shall be sized to be able to handle the additional camera signals.

Provide all necessary power and signal wiring to support the cypher lock mechanism on the door. See SECTION 01003. The Control Tower doors are to be alarmed. A local alarm is required.

#### 1.15 TELEVISION (CATV)

Provide 53mm (2") galvanized, rigid steel conduit which runs from the Telephone Equipment Room 122 to the west wall of Room 122. The conduit shall terminate at a weatherproof junction box located 914mm (3ft) below the eave. Provide an RG-6 cable in the conduit and terminate at the exterior junction box with 305mm (12-inches of slack). The end of the cable shall have an F-Type connector. Satellite dish is to be installed and provided by Others.

Flush mount receptacles shall be 381mm (15") above finished floor in rooms or if indicated shall be 152.4mm (6") below ceiling. The location of the outlets shall be coordinated with the interior design package (furniture layout), which may require different heights to work with the furniture and shall be approved by USAF Academy Communication Squadron personnel.

The CATV shall have all conduit, junction boxes, and RG-6, 75-ohm cable, and terminators for a complete and usable system in accordance with the guidance herein, in Attachment No. 9, and with the requirements given in UFGS 16710A. The cables shall be homerun to Telephone Equipment Room 122 and terminated at the backboard. NO DAISY CHAINING ALLOWED. Each cable is dedicated to a single outlet. The single-gang, outlet junction box for the jacks shall be sized in accordance with the requirements of UFGS 16710A and 16794 and Attachment No. 9. The CATV jacks shall be F-Type, female connectors. The 21 mm (3/4") conduit from the outlet box shall be terminated at the backboard in Telephone Equipment Room 122. Two duplex receptacles are required in Telephone Equipment Room 122 to support the CATV equipment.

All interior communication wiring systems shall have the cabling labeled with a unique alpha-numeric number at beginning and end termination points of the cable. This alpha-numeric number shall also be used placed by the jack on the device plate.

ROOM	ROOM NAME	Number of outlets
105	Briefing Room	1
107	Storage	1
109	Office	1
113	Conference Room	1
124	Office	1
125	Office	1
126	Flight Commander	1
131	Sub Briefing	1
132	Sub Briefing	1
133	Break Room	1*
134	Logger Room	1
401	Observation Area	1

\*Television will be wall mounted.

#### 1.16 CONTROL TOWER

Requirements for the Control Tower are found throughout this Section and in other Section. In addition to these requirements the following shall be used in the design/construction of the Control Tower.

##### 1.16.1 Control Cab Roof

Special attention is required in getting cables and conduit to the Control Cab Roof and Control Cab ceiling areas. These cables include, but are not limited to: antenna cables, power wiring, lightning protection, and other communication cabling.

##### 1.16.2 Control Cab Mounted Antennae

Provide two 103 mm (4 inch) conduits for the installation of antennae cabling from the ground floor to the roof of the cab. The steel support columns at the Cab are to be utilized to route the antennae cables to the roof in order to the reduce the siteline obstruction from the cab. Antennae bases shall not be higher than the top of the cab roof railer. Coordinate the conduit stubs with the location on the antennae mounting ring covered in SECTION 01003.

##### 1.16.3 Lighting

Lighting shall be in accordance with the Air Traffic Tower Design Guide and requirements given herein.

#### 1.17 EMCS (ENERGY MONITORING AND CONTROL SYSTEM)

The Control Tower and Control Tower Support facility and GATR building shall be wired for EMCS (Energy Monitoring and Control System). All EMCS sensors will be installed per Mechanical specifications. See Mechanical SECTION 01006 for EMCS options and requirements. The EMCS system shall be Seimens System 600 APOGEE. Provide the appropriate cable type (coaxial cable (RG-6/U) is believed to be the type) in 21mm conduit from each DDC panel to the patch panels located in the Telephone Equipment Room 122. Coordinate and provide the correct cable type and configuration per the requirements in Specification 15951. Provide power as required for all

EMCS or DDC components (such as dampers, VAV boxes, control panels, etc.) requiring power.

#### 1.18 WIRING METHODS

Wiring shall conform to NFPA 70, Electrical Work, Interior Specifications SECTION 16415A and the requirements of this section.

##### 1.18.1 Power Conductors

Interior conductors shall be copper only. Aluminum conductors are not allowed. Minimum conductor size shall be #12 A.W.G. Conductors shall be installed in conduits. Power and lighting conductors shall be 600 volt, Type THHN (in dry locations), and THW or THWN (in wet locations). Cabling systems such as Mineral-Insulated cables, metallic armored cables and nonmetallic-sheathed cables shall not be allowed on this project.

Most available terminating components and materials are UL approved based on use with 60°C conductor insulation in circuits of 100A or less and 75°C insulation in circuits over 100A. Conductors shall be sized based upon the 60°C ampacity column of NEC Table 310-16 for sizes through #1 AWG and the 75°C column for #1/0 and larger.

##### 1.18.2 Communication Conductors

Communication conductors shall be provided per paragraph "INTERIOR ELECTRICAL DISTRIBUTION SYSTEM" of this requirement and Premises Distribution System, Specification SECTION 16710A.

##### 1.18.3 Conduits

Wiring shall consist of insulated conductors installed in rigid aluminum conduit, rigid zinc-coated steel conduit, electrical metallic tubing, electrical nonmetallic tubing (ENT), or intermediate metal conduit IMC). ENT shall only be used where allowed by the NEC and only for the circuits going to communication outlets, except for those in the Apparatus and Vehicle Maintenance Rooms. ENT shall not be used for power circuits. Plastic conduit is allowed only underground or under the floor slab. Raceways shall be concealed within finished walls, ceilings, and floors. Conduit which is exposed along walls in areas which are subject to damage such as the Apparatus Room and Vehicle Maintenance shall use IMC along the walls.

#### 1.19 GROUNDING SYSTEM

The grounding system shall be designed in accordance with NEC Article 250, applicable portions of IEEE C2, IEEE 142, IEEE 1110, and the following criteria. In general, all metallic building components including reinforcing steel and miscellaneous metals shall be part of an electrically continuous ground system. Steel studs used in interior wall construction, T bars of the ceiling grid, diffusers of the air distribution system, and door hardware are exempt from this bonding requirement. Bonding shall be by exothermic welding or the brazing of a copper wire between components. Design shall be in accordance with Electrical Work, Interior Specification - SECTION 16415A and this section. All ground rods on the project shall be 19.05mm (3/4") x 3048mm (10') copper clad steel. Provide a ground ring around all exterior transformers and buildings.

##### 1.19.1 Communication Grounding System

All exposed non-current carrying metallic parts of the telephone equipment, cable sheaths, cable splices and terminals shall be grounded. Contractor shall provide a 305mm x 6mm (12" x 1/4") ground bar along each wall in each communications room. The bars shall be connected together by 6 AWG insulated copper cable. The ground system for rooms (121 & 123) shall be interconnected with #6 AWG insulated copper cable in 1/2" pvc conduit. The grounding system in these rooms shall be connected to a dedicated ground rod located outside which in turn is connected to the ground ring (counterpoise) for the facility.

A signal reference subsystem shall be provided for the Control Tower IAW Air Traffic Control Tower Design Guide.

Control Tower Cab 601 and electronic equipment rooms (121 and 123) require an equipment reference grid IAW Air Traffic Control Tower Design Guide.

#### 1.19.2 Grounding Conductors

A green equipment grounding conductor, sized in accordance with NFPA 70 shall be provided, regardless of the type of conduit. Equipment grounding bars shall be provided in all panelboards. The equipment grounding conductors shall be carried back to the service entrance grounding connection or separately derived grounding connection. Grounding conductors shall be provided in all branch (including lighting circuits) and feeder circuits.

#### 1.19.3 Earth Electrode System

Ground rods shall be 19.05mm (3/4") x 3048mm (10') copper clad ground rods. In addition to the ground rods, ground wells shall be provided for test purposes at each facility. These are the same ground wells indicated for the Lightning Protection System. Each building shall have a counterpoise.

#### 1.19.4 Separately Derived Systems

For dry-type transformers within buildings, the grounding electrode conductor shall be connected to adjacent structural steel per NEC. If there are multiple dry-type transformers within a room, a copper ground bar sized shall be used as the connection point. This bar shall be connected to the building ground ring via a ground rod located outside. The grounding bar and the conductor connected the bar to the ground ring shall be sized to handle the combined fault duty of the equipment connected. Use exothermic welds for the connection. If backup generators can assume building loads, interconnect with the service ground. Verify that connections are located so that any service ground fault equipment will operate as intended (one neutral bond or 4-pole transfer switches, etc).

#### 1.19.5 Raised Floor

The raised floor system shall be grounded to the facility counterpoise (ground ring) with #6 AWG copper conductor. The raised floor supports shall be grounded in two locations. The raised floor is located in Control Cab Room 601.

#### 1.19.6 Static Resistant Flooring

Static resistant flooring is to be provided in the Electronics Room 121 and Radio Repair Room 122 and elsewhere indicated in Section 01003. Comply

with all proper grounding of the flooring as required by the manufacturer.

#### 1.19.7 Ground Bus

Provide a ground bus next to the workbench and next to the floor in the GATR Bldg.

#### 1.19.8 Static Grounding Receptacles

GATR Bldg. Provide four (4) static grounding receptacles in the floor of the facility. Unit shall have a flush mount cover connected to the main body via a chain. A brass ball stud shall be in the main body for the connection point. Interconnect the receptacles with #4 AWG bare copper conductor and connect to the building counterpoise.

### 1.20 LIGHTNING PROTECTION SYSTEM

NFPA 780, Appendix H - Risk Assessment Guide conducted for the Control Tower indicates a risk (R) over 9 which indicates a severe category. Based on this assessment, the Contractor shall provide a lightning protection system for the Control Tower, Control Tower support facility, GATR Building and antenna towers by the GATR building in accordance with LIGHTNING PROTECTION SYSTEM - SECTION 13100A and NFPA 780. Lightning protection system provided shall include (but not limited to) air terminals 457.2mm (18"), main conductors, down conductors, bonding conductors, and 19.05mm (3/4") x 3048mm (10') copper clad steel ground rods interconnected by a counterpoise routed around the perimeter of the Control Tower. In addition to the ground rods, 4 ground wells (one at each corner of the building) shall be provided for test purposes. All conductors shall be copper, except that aluminum or bronze may be used for connection to mechanical aluminum housings. All connections below grade, to main conductor and down conductor shall be by exothermic weld process. Alternate bonding methods will be allowed to metal bodies (vent hoods, exhaust stacks...) which have light enough weight to make exothermic welds impractical. Down conductors shall be concealed in pvc conduit. The down conductors on the Control Tower/Control Tower Support Facility shall be concealed within the wall construction.

Utilize threaded rod in PVC or fiberglass pole to attain required height above tower antennae - minimum height is 457 mm (18 inches) if within 457 mm (18 inches) of antennae.

### 1.21 FIRE DETECTION AND ALARM SYSTEM

The fire detection and alarm system requirements are provided in Fire Protection SECTION 01008 and herein. Design shall be in accordance with Fire Detection and Alarm Specification, Addressable - SECTION 13851A and the requirements of Fire Protection SECTION 01008. Fire alarm system shall be addressable to each device. In addition to the generator back-up, batteries shall be provided.

### 1.22 Screen Room 102 in GATR Building

The EMI/RFI screen enclosure shall be 2.15m wide X 3.16m long X 2.48m high (7'1/2" X 10'4-1/2" X 8'1-3/4") outside dimensions. The exterior shield shall be copper and the interior shield shall be copper. The attenuation characteristics shall be as follows: magnetic 14 kHz - 68 dB; electric 14 kHz - 120 dB; 450 MHz planewave - 110-120 dB; 1GHz planewave - 90-110 dB; microwave 10 GHz - 50 - 80 dB. The enclosure shall be grounded per the

manufacturer's instructions. Provide and install a power filter rated for one 20amp, 120V circuit. One suitable manufacturer is Lindren.

### 1.23 EQUIPMENT SIZING REQUIREMENTS AND RATINGS

Required capacity of the equipment bus shall be computed from the estimated maximum demand for the panelboard, switchboard, switchgear, motor control center and specified as the next larger manufactured standard bus or main lug size. The EMD shall be calculated as indicated in SECTION 01336. Overcurrent protection for panelboards, switchboards, switchgear and motor control centers with heavy motor loads, sizing must also consider starting current of the largest motor or motors in addition to the continuous demand amperes correlating to the EMD watts or volt-amperes.

#### 1.23.1 Interrupting Capacities

Equipment ratings shall be determined based on results of the short circuit analysis required in SECTION 01338. Minimum standard interrupting ratings shall be identified on the plans preferably on a one-line diagram or alternately in panel schedules. Ratings may be called out in the specifications when single items are involved. The designer shall identify variables (such as equipment impedances) which could affect available short circuit current and verify that equipment acceptable under contract plans and specifications would not permit fault current levels higher than the specified interrupting ratings.

#### 1.23.2 Transformers

##### 1.23.2.1 Oil Filled Transformers

Facility transformer shall be sized to have a minimum of 25% spare capacity above the estimated maximum demand for the building.

##### 1.23.2.2 Dry Type Transformers

Dry type distribution transformers be sized for the EMD plus have 25% spare capacity. Dry type transformers larger than 75 kVA shall be tested per the requirements in SECTION 16415A.

#### 1.23.3 Feeders and Branch Circuits

Branch circuit sizes shall be based on the load supplied EMD and voltage drop requirements given in SECTION 01336. Feeders to distribution equipment such as panelboards, motor control centers, and switchboards shall be sized to allow the full capacity of the panelboards, motor control centers, and switchboards bus bar amperage rating to be used. Voltage drops shall be taken into account in accordance with SECTION 01336.

##### 1.23.3.1 Transformer Feeders

Sizes for primary and secondary feeders for transformers shall be based on the transformer kVA instead of the EMD on the transformer. This criteria also applies to the service entrance conductors.

##### 1.23.3.2 Neutral Sizing

Use of full size neutrals shall be standard practice. For all applications involving discharge type lighting (fluorescent, HID) or other harmonics generating equipment (inverter, variable frequency drives, other solid

state apparatus), the neutral must be treated as a current carrying conductor. In data processing applications including personal computers, the neutral must be sized larger than the phase conductors. Size the neutral at 133 percent minimum (of the phase conductors) unless a harmonic analysis or field data demonstrates that a smaller size would be adequate. Multi-wire branch circuits with oversized neutrals shall not share a common neutral, but will have an individual neutral for each phase conductor.

#### 1.23.3.3 Derating

Ampacity of conductors is to be derated per NEC Article 310, if more than three current carrying conductors are installed in a raceway. When nonlinear loads are served, the neutral must be treated as a phase conductor. If a double size neutral is employed, count it as two line conductors.

#### 1.23.3.4 Parallel Runs

Use of bus duct should be considered in lieu of parallel runs of cable when required ampacity is at or above 800A. Parallel runs of cable shall be limited to a maximum of 4. Equipment grounding conductors in each leg must be sized to carry the total fault current based on the rating of the upstream overcurrent device.

#### 1.23.4 Nuisance Tripping

For a period of one year after construction, the contractor shall be responsible for correcting problems which may arise from nuisance tripping. Nuisance tripping shall be defined as having breakers or fuses activating under an overload condition while the equipment was being operating within manufacturer parameters. These situations shall be corrected by making changes to the installation at no cost to the government. These corrections can be increasing the trip setting or fuse size, as long the increased setting is still at or below setting maximums given in NFPA 70. Any change could impact other items not listed such as conductor sizing and upstream coordination settings.

#### 1.24 Schedule of Connections

All control and communication wiring associated with the operation of the equipment in the Control Cab Room 601 and its interface to other systems shall provide a schedule of connections which as a minimum comply with the following items.

- a. Provide a means of rapidly identifying the circuits in any conduit, panel, device backbox or other electrical enclosure, including complete circuit routing from origin to termination.

The schedule of connections shall identify by number:

- a. All junction boxes, device backboxes, terminal cabinets, equipment cabinets and electrical enclosures.
- b. All system conduits and pull boxes.
- c. All system conductors, including point-to-point routing and terminations.

The schedule of connections shall cross-reference the equipment, conductors and raceway components as follows:

- a. For each unique wire/circuit number, the schedule shall as a minimum indicate:



1. Origin and destination, showing both equipment (tag number) and termination identification.
2. Conductor description including size, type, color code and configuration.
3. Routing information comprised of a listing of conduit, junction box, pull box, device backbox, panel, terminal cabinet and electrical enclosure numbers reflecting a progressive route selected for each conductor/circuit from point of origin to destination (termination to termination).
- b. For each unique conduit, junction box, pull box, device backbox, panel, terminal cabinet and electrical enclosure number, the schedule shall as a minimum indicate:
  1. Conduit size.
  2. A listing of conductors/circuits carried.

#### 1.25 TESTING

Contractor shall provide all testing required by all specifications provided to the Contractor. Testing shall include low voltage conductors, high voltage conductors and communication conductors and all other mandatory testing required by the specifications provided with this section.

#### 1.26 TRAINING

Training shall include the emergency generator system and all other mandatory training required by the specifications. If VFDs are used, then provide special operational and maintenance training that is at least 8 hours long. Fire alarm system training is covered in SECTION 01008.

#### 1.27 TECHNICAL SPECIFICATIONS

Government provided (UFGS) technical guide specifications (available to the Design-Build Contractor as indicated in SECTION 01332, SUBMITTALS FOR DESIGN) shall be completely edited and fully coordinated with the technical requirements given in the drawings to accurately and clearly identify the product and installation requirements for the facility. The specifications shall be edited in accordance with the designer notes associated with each specification and with the Specification Requirements (Division 01 General Requirement Specifications). In case of a conflict, the criteria found in the Specification Requirements (Division 01 General Requirement Specifications) shall take precedence. The provided specifications define the minimum requirements for items of equipment, materials, installation, training, operating and maintenance instructions, O&M manuals and testing that shall be provided for the facility. Where items of equipment, materials, installation, training, operating and maintenance instructions, O&M manuals or testing requirements are not covered in the provided specifications, special Sections within each guide specification(s) shall be prepared to cover those subjects. Specific items of equipment identified in the provided specifications but not required for the facility shall be edited out. Government approval is required for any specification addition or deletion.

PART 2 NOT USED

PART 3 NOT USED

-- End of Section --

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## SECTION 01008

### FIRE PROTECTION REQUIREMENTS

#### PART 1 FIRE PROTECTION REQUIREMENTS

##### 1.1 GENERAL PARAMETERS

Fire protection shall be based on sound fire protection engineering principles that gives safeguards against loss of life and property by fire, consistent with the mission, risk involved, and economical utilization. Fire protection criteria shall be based on the following code requirements:

- Uniform Building Code (1997 Edition)
- NFPA 101 (Life Safety Code, 2000 Edition)
- NFPA 72 (National Fire Alarm Code, 1999 Edition)
- NFPA 13 (Installation of Sprinkler Systems, 1999 Edition)
- Military Handbook 1008C (Mil.HdBk, 10 June 1997)

Design Guide                      Air Traffic Control Tower Design Guide is found on web site  
[http://www.3di.com/sanantonio/atct1001/images/ATCT\\_RAPCON\\_Guide.pdf](http://www.3di.com/sanantonio/atct1001/images/ATCT_RAPCON_Guide.pdf)  
ANSI S3.41 Audible Emergency Evacuation Signal 1996

All applicable requirements of the aforementioned codes shall be incorporated into the design. Life Safety Code, NFPA 101 relative to this design shall give special attention to the application of fire codes as they relate to Life Safety. Features of fire protection based on the following shall be included in the design: automatic operating devices; exiting for inhabitants and the protection of egress components; personnel safety in hazardous areas; appropriate ratings of partitions, doors and windows; travel distances; common paths of travel; occupancy types; hazard of occupancies and their contents; isolation from the remainder of the facility; etc.

Applicable requirements of the Uniform Building Code shall also be included in the design. These shall include the following: Types of construction; Fire area limitations; increases to allowable floor areas; separation of structures.

All military construction must comply with the code requirements set/forth in Military Handbook 1008C.

##### 1.1.1 Types of Occupancies and List of Hazardous Areas/Essential Equipment

###### 1.1.1.1 Occupancy Classification

This project consists of one building. The building shall be an Business Occupancy and a Special Structure (specifically a "tower" in accordance with NFPA 101, Section 11.3). According to the Uniform Building Code (UBC), the building shall be classified as "Group B" occupancy in accordance with Chapter 3, Table No. 3A.

###### 1.1.1.2 Classification of Hazard of Contents

The classification of hazard of contents shall be determined by the portion of each building which has the greatest hazard.

### 1.1.2 Separation of Structures

#### 1.1.2.1 Exposure Classification

The building construction for the control tower is multi-story, while the other facilities are single-story. The types of non-combustible roof construction options available for each facility shall be determined by the Proposer.

#### 1.1.2.2 Separation Distance in Meters

UBC, Table 5-A requires a separation of 1.5 meters , unless the exterior wall has a two-hour rating.

### 1.1.3 Fire Fighting Support

The main fire fighting support shall be supplied by an automatic wet pipe sprinkler system. This fire protection and suppression system shall be tied into the building's fire detection and alarm system. The building shall be provided with fire extinguisher cabinets. These shall be located so that not more than 23 meters of travel distance between fire extinguisher cabinets shall be required at any point in the facility. The fire extinguisher cabinets shall be of the fully recessed type in all finished areas.

In addition a zoned fire alarm system shall be provided that covers the various parts of the building, monitoring of the sprinkler system, air handling units, etc..

See subsequent paragraphs of this Fire Protection section for additional information regarding fire suppression, detection, and other aspects of fire fighting support. Fire extinguishers are to be Contractor furnished/Contractor installed.

## 1.2 FUNCTIONAL AND TECHNICAL REQUIREMENTS

### 1.2.1 Construction for Fire Resistances of the Building Including Roofs, Walls, and Doors.

#### 1.2.1.1 Building Construction Type

Each building shall comply with a minimum Type II-1hr in accordance with UBC, Table No. 6-A.

#### 1.2.1.2 Exterior Walls

Exterior walls of the facilities shall be 1-hour rated as long as minimum distances from other buildings are maintained.

#### 1.2.1.3 Roof

The building roof covering shall be Factory Mutual Approved or classified by Underwriter's Laboratory as Class A, roof system.

#### 1.2.1.4 Interior Walls

Fire resistive walls shall be constructed around stair enclosures or separate janitor's closets, mechanical rooms, electrical rooms, and communications rooms per NFPA 101, from other parts of the buildings. All

penetrations in fire rated walls (conduits, pipes, cable trays...etc.) shall be fireproofed according to their respective wall/floor/ceiling rating (sealed) at each penetration.

#### 1.2.2 Type of Occupancies, Occupant Loads, Exits, and Travel Distances to Exits

##### 1.2.2.1 Occupancies

The facility shall be considered an business and special occupancy in accordance with NFPA 101.

##### 1.2.2.2 Occupant Load

For purposes of determining required exits, the occupant load shall be based upon the maximum number of persons intended to occupy that space but not less than NFPA 101, Chapter 38.

##### 1.2.2.3 Means of Egress

Exits shall be accessible from every part of the facility. The number of means of egress shall be determined by Chapters 38 and 11 in NFPA 101.

##### 1.2.2.4 Travel Distance to Exits

Allowable travel distance limits to exits shall be per NFPA 101, Chapters 38 and 11.

##### 1.2.2.5 Allowable Floor Area

Allowable floor area limitations shall be in accordance with UBC, Table 5-B and Section 504. Proposer shall determine construction type and apply the applicable portion of this code requirement. However, it is required that each building, be provided with a 100% sprinkler coverage automatic sprinkler coverage.

##### 1.2.2.6 Maximum Building Height

Maximum height limitations are outlined in UBC, Table 5-B.

#### 1.2.3 Fire Extinguisher Cabinets

Fire extinguisher cabinets shall be provided per NFPA 10 with a travel distance between fire extinguisher cabinets not to exceed 23 meters. Fire extinguisher cabinets shall be fully-recessed in finished areas, such as administrative, conference, corridors, etc.. Fire extinguishers shall be part of this contract.

#### 1.2.4 Sprinkler Systems

Sprinkler systems shall be provided for 100% coverage and shall be a wet pipe sprinkler system. Systems design shall be in accordance with NFPA 13 and Military handbook 1008C. An area of demand of 279 square meters shall be used for the wet pipe sprinkler system. Density for light hazard shall be 4.07 L/min/square meter and for ordinary hazard, group 1 shall be 6.11 L/min/square meter. The hose stream demand shall be 946 L/min for the light hazard and 1892.5 L/min for the ordinary hazard.

#### 1.2.5 Fire Department Connections and Fire Hydrants

Fire Department connections for the sprinkler system(s) shall be provided with suitable all weather access for pumper apparatus within 46 meters, reference Mil Handbook 1008C, Section 2.11.1. A minimum of one fire hydrant shall be located within 46 meters of the fire department connections, reference Mil Handbook 1008C, Section 5.7.3.2 (a).

#### 1.2.6 Resistance to Interior Finishes and Materials to Flame Spread and Smoke Development

##### 1.2.6.1 Interior Finishes

Interior finish materials on walls, ceilings, and partitions in all exits shall be Class A as defined in the Uniform building Code (UBC) and Mil. HdBk 1008C Section 2.7. All other areas shall have Class A or B interior finish materials for walls, ceilings, and furnishings. Smoke Developed Ratings shall not exceed 50 for Class A materials and 100 for Class B materials when tested in accordance with ASTM E-84.

##### 1.2.6.2 Cellular Plastics

Cellular Plastics shall not be used as interior wall and ceiling materials per Mil HdBk. 1008C, Section 2.7.

##### 1.2.6.3 Floor Finishes

Floor finishes shall be Class I or Class II. Carpet and other floor finishes shall have passed the acceptable criteria of American Society for Testing and Materials (ASTM) standard 84 or equivalent.

#### 1.2.7 Fire Alarm and Detection System

The fire alarm and detection system(s) shall be compatible with and tied into the existing BASE system. The entire facility shall have automatic fire detectors designed in accordance with NFPA 72 and NFPA 101. Manual pull stations shall be provided and located in accordance with NFPA 101. Supervisory initiating devices shall be provided and designed in accordance with NFPA 13 and 72. Placement of audio/visual devices shall comply with the Americans with Disabilities Act (ADA), paragraph 4.28 and NFPA 72, Chapter 6. Use the most stringent requirements from ADA or NFPA 72 where conflicts occur. Outside electric bell for sprinkler system(s) shall also be provided with a visual strobe. The facility shall be provided with a main control panel. Design shall be in accordance with Fire Detection and Alarm Specification, Addressable - SECTION 13851a. Fire alarm system shall be addressable to each device. Hybrid systems which have addressable loops are NOT acceptable. Fire alarm reporting systems shall be compatible with USAF Academy central base station equipment which is Noti-Fire-NET by Notifier. All alarms/status conditions for each device shall report/sound/flash local to the facility and also report back to the BASE Fire Department. Contractor shall provide all programming required at the fire alarm panels, at Building 8130, and at the BASE Fire Department to accommodate the new fire detection and alarm systems. The fire alarm system shall comply with the requirements given in the Air Traffic Control Tower design guide.

The fire alarm system shall comply with the following: IAC circuits shall be Class A, Style D; SLC circuits shall be Class A, Style 6; NAC circuits; shall be Class A, Style Z. The exception is that tamper switches can be



Class B, Style B. The battery back-up for the fire alarm panel shall be 72 hours.

#### 1.2.7.1 Panel Location and Configuration

The Main Fire Alarm control panel for the Control Tower and the Control Tower Support facility shall be located in Vestibule Room 101 with a remote annunciator located in the Control Cab 601. Remote annunciator shall be semi-recessed in the back wall of the cab. Provide all necessary modems cards, etc. for the building alarm and trouble to be sent. The signals go to Communications Building 8130 where it is routed to Building 9224. Provide all necessary equipment and programming to make the system complete. Final location and number and type of signals for the Main Fire Alarm control panel shall be coordinated with the BASE Fire Marshall.

A fire alarm panel shall be provided in the GATR Building. The fire alarm panel shall have a direct building to building connection over telephone type cables with the Notifier Noti-Fire-NET type fire alarm panel located in Building 9206. Use dry contacts and send general building alarm and trouble. Provide all necessary modems cards, etc. for the building alarm and trouble to be sent. The signals go to Communications Building 8130. Provide all necessary equipment and programming to make the system complete. Final location and number and type of signals for the Fire Alarm control panel shall be coordinated with the BASE Fire Marshall.

#### 1.2.7.2 Connection

See SECTION 01007 regarding the communication connection requirements for the fire alarm. Provide, install and test any modems or patch cords necessary to have the system operate fully. Provide wiring from the fire alarm panel to the the communication equipment connected to the central fire station head end equipment.

#### 1.2.7.3 Detectors

Heat detectors are to used unless NFPA 72, Air Traffic Control Tower Design Guide, or other codes require the use of smoke detectors. A smoke detector shall be located near the main fire alarm control panel, even if the room has a sprinkler system.

Use smoke detectors above ceilings if this area is used as a return air plenum. The detector must be listed for the air velocities present. Provide smoke detectors under raised floors even if the area is not used as a return air plenum.

Detectors in the GATR building do not have to be installed in the Shield Room.

#### 1.2.7.4 NFPA 13 and NFPA 72 Requirements

Provide control modules, smoke detectors, heat detectors, OS&Y tamper switches and water flow switches as required by NFPA 13 and NFPA 72. The notification appliances shall be with flashing strobe.

#### 1.2.7.5 Other Requirements

Provide duct detectors, manual pull stations, flow switches, tamper switches, notifications appliances, etc.. The notification appliances shall be with flashing strobe (use red cover over the strobes).

A fire pump may be required for the Control Tower. If it is determined that a fire pump is required, the power connection to the controller and fire pump shall be in accordance with NFPA 70 and NFPA 72. In addition, the fire alarm panel shall monitor the points required by NFPA 72. Fire pump shall be connected to the emergency generator.

#### 1.2.7.6 Alarm Verification

The system shall be provided with alarm verification features. The alarm verification features shall reduce false alarms due to transient conditions. The alarm/activation delay shall be adjustable from 0 to 60 seconds.

#### 1.2.7.7 Indicating Devices

Evacuation indicating signalling devices shall be provided and designed in accordance with NFPA 101. Evacuation alarms shall be activated by a smoke detector, a manual pull station, or a flow switch. Horns shall be provided throughout the facility (emphasis on corridors and entrance/exit points) to ensure 15 db above ambient is met. In addition, audible alarms shall conform to ANSI S3.41. Provide device(s) for noisy areas; i.e., Mech. Rooms and Break Rooms. An electric alarm horn (gong) shall be provided on the exterior of the facility above the fire department connection. This horn shall alarm upon indication of flow from the sprinkler system(s) and have a different tone from other audible devices provided under this contract.

The strobe located in Control Cab 601 shall be located to not interfere with any operations. The horn located in the Control Cab 601 shall be adjusted to the lowest possible level.

#### 1.2.7.8 Schedule of Connections

All wiring associated with the operation of the facility fire alarm system and its interface to other systems shall provide a schedule of connections which as a minimum comply with the following items.

- a. Provide a complete record of all system connections for future system expansion, maintenance and testing.
- b. Provide a means of rapidly identifying the circuits in any conduit, panel, device backbox or other electrical enclosure, including complete circuit routing from origin to termination.

The schedule of connections shall identify by number:

- a. All junction boxes, device backboxes, terminal cabinets, equipment cabinets and electrical enclosures.
- b. All system conduits and pull boxes.
- c. All system conductors, including point-to-point routing and terminations.

The schedule of connections shall cross-reference the equipment, conductors and raceway components as follows:

- a. For each unique wire/circuit number, the schedule shall as a minimum indicate:
  1. Origin and destination, showing both equipment (tag number) and termination identification.
  2. Conductor description including size, type, color code and configuration.
  3. Routing information comprised of a listing of conduit, junction

box, pull box, device backbox, panel, terminal cabinet and electrical enclosure numbers reflecting a progressive route selected for each conductor/circuit from point of origin to destination (termination to termination).

b. For each unique conduit, junction box, pull box, device backbox, panel, terminal cabinet and electrical enclosure number, the schedule shall as a minimum indicate:

1. Conduit size.
2. A listing of conductors/circuits carried.

#### 1.2.7.9 System Design

The fire detection system shall be designed IAW the above criteria, with the criteria specified in paragraph SYSTEM DESIGN of technical specification SECTION 13851a, FIRE DETECTION AND ALARM SYSTEM, ADDRESSABLE, and with the criteria specified SECTION 01007 ELECTRICAL REQUIREMENTS.

### 1.3 DESIGN OBJECTIVES AND PROVISIONS

#### 1.3.1 Zoning and Treatment of Each Potential Hazard

##### 1.3.1.1 Walls

All areas where a potential hazard exists greater than that of the primary occupancy, shall be separated from the primary occupancy by walls having not less than 1-hour fire resistive construction.

##### 1.3.1.2 Limiting Fire Spread

Every horizontal opening, and hazardous location as defined by NFPA 101 shall be protected.

##### 1.3.1.3 Fire Alarms and Extinguishing Systems

The facilities shall be provided with a fire suppression system and a detection system as indicated previously.

#### 1.3.2 Dead Ends

\* Maximum dead ends shall be as per NFPA 101 .

#### 1.3.3 Egress Locations

Egress locations shall be marked with exit signs per NFPA 101.

#### 1.3.4 Outside Exit Doors

Doors for outside exit doors shall swing in the direction of exit travel. Outside exit doors shall be equipped with panic hardware mounted 1,118 mm above the finish floor and have a minimum clear width of 864 mm to allow for egress.

#### 1.3.5 Required Fire Exits

Required fire exits from the building shall lead to a public way or to a clear safe area at a minimum distance of 23 meters from the building.

### PART 2 NOT USED

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PART 3 NOT USED

-- End of Section --

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SECTION 01040

AS-BUILT DRAWINGS  
5/00; Rev 11/01

PART 1 GENERAL

1.1 DEFINITIONS

The definitions listed below form a part of this specification.

1.1.1 Construction Drawings

Final design drawings accepted by the Government for construction of the project.

1.1.2 Red-Line Drawings

Construction drawings marked-up to show actual work performed to include necessary sketches, modification drawings, shop drawings and notes. Green ink is used to indicate work deleted from the contract. Red ink is used for additions and deviations from the contract.

1.1.3 As-Built Drawings

Professional finished drawings and electronic CADD files developed from the construction drawings that include all of the information from the redline drawings and suitable for half-size reproduction.

1.1.4 Not Used

1.1.5 Black-Line Drawings

Paper drawings reproduced from reproducible drawings or electronic CADD files and suitable for microfilming.

1.1.6 Full-Size Drawings

841mm x 594mm size drawings with all details visually readable.

1.1.7 Half-Size Drawings

420mm x 297mm size drawings with all details visually readable.

1.1.8 Modification Circle

A circle with a horizontal line through the center. The top half will contain the letter "P" with the bottom half containing the Modification number. The lettering standard will be 120/6 WRICO or similar.

1.1.9 Electronic CADD Files

Electronic CADD files are files saved on CD-ROM in accordance with appropriate CADD standard. The CADD standard will include level on/off status, special characters, line weights, font, and size requirements.

## 1.2 GENERAL REQUIREMENTS

The work includes creation of electronic cadd files in AutoCADD 2000 and CALS as-built drawing file formats to accurately depict existing conditions of the project. As-Built Drawings will become the permanent record drawings of the construction. The Contractor is responsible for development of electronic CADD files in accordance with Omaha DistrictCADD standards. Omaha District's CADD standards are located on the Omaha District's FTP site (<ftp://ftp.nwo.usace.army.mil/pub/ED/CADD/ae/standards/ACADstd.pdf>) for AutoCADD. Use Omaha District's standard plot tables and borders. The As-Built drawings shall include all major features of the work and all details to the same level as the construction set of drawings. All changes from the construction drawings, including but not limited to all deviations, additional information, and modifications to the contract. Where contract drawings or specifications allow for options, only the option selected and actually constructed shall be shown on the As-Built Drawings. Systems designed or enhanced by the Contractor such as HVAC control system, fire alarm system fire sprinkler system, irrigation sprinkler system, letters of clarification, shall be accurately and neatly recorded on the As-Built Drawings using the same symbols, terminology, and general quality as the construction set drawings. All sheets affected by a change shall be revised. The transmittal requirements for the As-built Drawings shall be shown as events on the Contractor prepared progress chart or network analysis system (NAS), whichever is applicable.

## 1.3 PAYMENT

In accordance with the clause "Payment Under Fixed - Price Construction Contracts", which provides for progress payments on estimates of work accomplished (which meets the standards of quality established under the contract), \$(number of drawings in accepted design package x \$250 per sheet) will be withheld from payment for the creation of As-Built drawings until the final as-built drawings are delivered to the Contracting Officer (including any necessary revisions and subject to the approval of the Contracting Officer).

## 1.4 TRANSMITTAL OF AS-BUILT DRAWINGS

### 1.4.1 Preliminary As-Built Drawings

The Contractor shall produce Preliminary As-Built Drawings indicating as-built conditions on AutoCADD (Version 2000) with "clouding". Preliminary drawings shall consist of 15% of total project drawings. The As-Built CADD files which include all changes up to the time Preliminary Drawings shall be sent as stated below. The Contractor shall draw attention to all drawing changes by "clouding" the affected area. This "clouding" will be accomplished on layer 63 of the drawing file. The Preliminary Drawings shall consist of one (1) set of CADD files on a CD and one (1) full-size set of the Black-Line Drawings. One (1) set of CADD files on a CD shall be submitted to the Omaha District Office (ATTN: CENWO-ED-DI, Jim Janicek). One (1) full-size of the Black-Line Drawings shall be submitted to the COR. Both documents shall be submitted three (3) weeks prior to the final acceptance inspection unless otherwise directed by the COR. The COR will notify the Contractor in writing of approval / disapproval. The Contractor shall not submit the Final Drawings until he receives the COR's letter approving the Preliminary Drawings.

### 1.4.2 Final As-Built Drawings

The Contractor shall produce Final As-Built Drawings in AutoCADD (Version 2000) and CALS drawing file formats without "clouding". The Final Drawings shall include all changes. The Final Drawings shall be submitted to the COR and Omaha District Office (CENWO-ED-DI) no earlier than the day of acceptance of the project and no later than thirty (30) days after the date on the acceptance letter for the Preliminary Drawing unless otherwise directed by the COR. **(Note: Final drawings should not be forwarded to the customer until after the Corps of Engineers, Omaha District has performed a Quality Review.)** Send the following documents to both the Omaha District Office (Attn: CEMRO-ED-DI, Jim Janicek) and the Area or Resident Office (as directed) for use by the installation: One (1) set of CADD files on CD (folder name containing as-built files shall be designated "AS-BUILTS" on each CD-ROM) and one (1) set of CALS files on CD. CD cases and CD's shall contain the name of the project, location, specification number, and contract number, file format and words "As-Built Record Set". The folder shall contain drawings, indexes and X-REF (CADD CD only) files related to all as-builts. In addition a copy of all red-lined hard copy drawings prepared by the Contractor during construction shall be submitted to the Area or Resident Office (as directed).

#### 1.5 PROCEDURE

The Contractor shall create a set of electronic Cadd files and full-size Red-Line Drawings to fully indicate As-Built conditions. The Red-Line Drawings shall be maintained at the site, in a current condition until the completion of the work and shall be available for review by the COR at all times. All as-built conditions shall be on the Red-Line Drawings within two (2) days after the work activity is completed or shall be entered on the deficiency tracking system (see Section 01451A, CONTRACTOR QUALITY CONTROL).

#### 1.6 TITLE BLOCKS

The contract number and the specification number (if available) shall be shown on all sheets. "RECORD DRAWING" shall be added below the title block on all sheets. All modifications to the contract shall be posted in ascending order. The top line of the revision box shall state "REVISED TO SHOW AS-BUILT CONDITIONS" and dated (month and year completed). All modifications to all plans, sections, or details, shall have a modification number placed in the revision box under column entitled "Symbol". The statement "GENERAL REVISIONS" may be used when applicable. The date to be added in the revision box for modifications is found in Block 3 of Form SF-30.

#### 1.7 PROCEDURES FOR POSTING MODIFICATION CHANGES TO DRAWINGS

Follow directions in the modification for posting descriptive changes.

A Modification Circle shall be place at the location of each deletion.

The highest modification number on the sheet should be shown in the modification circle in the "DATE" and "DRAWING CODE" boxes of the title block.

For all new details or sections that are added to a drawing, place a Modification Circle by the detail or section title.

For changes to a drawing, place a Modification Circle by the



title of the affected plan, section or detail titles (each location).

For changes to schedules on drawings, a Modification Circle shall be placed either by the schedule heading or by the change in the schedule.

The Modification Circle size shall be 1/2-inch diameter unless the area where circle is to be placed is crowded. Use smaller size circle for crowded areas.

#### 1.8 WORD ABBREVIATIONS

Abbreviations shown on the abbreviation sheet shall be used to describe all work items. Additional word abbreviations, not found on the abbreviation sheet but necessary to describe the work, shall be properly identified and incorporated with the other standard word abbreviations.

#### 1.9 LEGEND SHEETS

Symbols, which conflict with those on the construction drawings legend sheet, shall not be used. Additional symbols, properly identified, necessary to depict any additional work items, shall be added to the legend sheet or supplemental legend. Those projects that do not have legend sheets may use supplemental legends on each sheet where symbol is shown.

#### 1.10 CONTRACTOR SHOP DRAWINGS

Contractor shop drawings, which supersede data on the contract plans and/or additional drawings, prepared by the Contractor, shall be incorporated into the As-Built Drawings. Design plans prepared by Contractor shall include the designer's name on the As-Built Drawings.

#### 1.11 INDEXING OF DRAWINGS

If drawings are added to the portfolio of drawings to depict as-built conditions, the index of drawings shall be revised accordingly.

### PART 2 PRODUCTS (NOT APPLICABLE)

### PART 3 EXECUTION

#### 3.1 GENERAL

As-Built drawings shall include as-built information to the same level of detail as shown on the construction drawings set details, unless otherwise specified. The Contractor shall provide any additional full-size drawings as required to display all the details.

#### 3.2 SITE WORK

##### 3.2.1 Utilities

All utilities shall be shown whether active, inactive, shown on the construction drawings, or found on-site. The type of utility, location, general direction, size, material make-up and depth shall be shown. The location and description of any utility line or other installations of any kind known to exist within the construction area shall be shown. The location shall include dimensions to permanent features.

##### 3.2.2 Structures

Structures above and below ground shall be shown. The size, material make-up, location, height, and/or depth shall be shown. Manholes shall show rim elevation and invert elevations as applicable. Power poles shall show electrical equipment and voltage rating.

### 3.2.3 Grades

Grade or alignment of roads, structures, or utilities shall be corrected if any changes were made from the contract drawings. Elevations shall be corrected if changes were made in site grading.

## 3.3 STRUCTURAL

### 3.3.1 Steel

Shop drawings that deviate from the construction drawings shall be incorporated in the As-Built Drawings.

## 3.4 ELECTRICAL

### 3.4.1 PANELS

All construction set drawing panel schedules shall be revised to show as-built conditions. Home-run circuit designation on electrical drawings shall accurately correspond to the as-built panel schedules.

### 3.4.2 Controls

All control diagrams on the construction drawings shall be revised to reflect as-built conditions, and setpoints.

-- End of Section --

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SECTION 01200

WARRANTY OF CONSTRUCTION

**5/00 (Rev 10/00)**

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PART 2 NOT USED

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-- End of Section Table of Contents --

SECTION 01200

WARRANTY OF CONSTRUCTION  
**5/00 (Rev 10/00)**

PART 1 GENERAL

1.1 WARRANTY OF CONSTRUCTION

(a) Foremost and in addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (i) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier.

(b) This warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.

(c) The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Government-owned or controlled real or personal property, when that damage is the result of--

(1) The Contractor's failure to conform to contract requirements;  
or

(2) Any defect of equipment, material, workmanship, or design furnished by the Contractor.

(d) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause.

(e) The Contractor's warranty with respect to work restored, repaired or replaced will run for 1 year from the date of restoration, repair or replacement. This provision applies equally to all items restored, repaired, or replaced under paragraph (c) and (d) above.

(f) The Government will notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage. Repair work necessary to correct a warranty condition which arises to threaten the health or safety of personnel, the physical safety of property or equipment, or which impairs operations, habitability of living spaces, etc., will be performed by the Contractor on an immediate basis as directed verbally by the Government. Written verification will follow verbal instruction.

(g) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of verbal or written notice, the Government shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

(h) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall--

(1) Obtain all warranties that would be given in normal commercial practice;

(2) Require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer; and

(3) Enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.

(i) In the event the Contractor's warranty under paragraph (b) of this clause has expired, the Government may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

(j) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.

(k) This warranty shall not limit the Government's rights under the Inspection and Acceptance clause of this contract with respect to latent defects, gross mistakes, or fraud.

## 1.2 ADDITIONAL WARRANTY REQUIREMENTS

### 1.2.1 Performance Bond

(a) It is understood that the Contractor's Performance Bond will remain effective for one (1) year from the date of acceptance.

(b) If either the Contractor or his representative doesn't diligently pursue warranty work to completion, the contractor and surety will be liable for all costs. The Government, at its option, will either have the work performed by others or require the surety to have it done. Both direct and administrative costs will be reimbursable to the Government.

### 1.2.2 Pre-Warranty Conference

(a) Prior to contract completion and at a time designated by the Contracting Officer or his authorized representative, the Contractor shall meet with the Contracting Officer or his authorized representative to develop a mutual understanding with respect to the requirements of the Paragraph: WARRANTY OF CONSTRUCTION. Communication procedures for Contractor notification of warranty defects, priorities with respect to the type of defect and other details deemed necessary by the Contracting Officer or his authorized representative for the execution of the construction warranty shall be established/reviewed at this meeting.

(b) In connection with these requirements and at the time of the Contractor's quality control completion inspection, the Contractor will furnish the name, telephone number and address of the service

representative which is authorized to initiate and pursue warranty work action on behalf of the Contractor and surety. This single point of contact will be located within the local service area of the warranted construction, will be continuously available, and will be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any Contractual responsibilities in connection with the paragraph: WARRANTY OF CONSTRUCTION.

(c) Local service area is defined as the area in which the contractor or his representative can meet the response times as described in paragraph 1.2.4 and in any event shall not exceed 200 miles radius of the construction site.

#### 1.2.3 Equipment Warranty Identification

The Contractor shall provide warranty identification tags on all mechanical and electrical equipment installed under this contract. Tags and installation shall be in accordance with the requirements of Paragraph: EQUIPMENT WARRANTY IDENTIFICATION TAGS.

#### 1.2.4 Warranty Service Calls

The Contractor or his local service representative will respond to the site, to a call within the time periods as follows: Four (4) hours for Heating, Air Conditioning, Refrigeration, Air Supply and Distribution, Critical Electrical service Systems and Food Service Equipment and Twenty-Four (24) hours For All Other Systems.

#### 1.2.5 Equipment Warranty Booklet

At or before 30 days prior to final inspection and acceptance of the work, the Contractor shall submit the data mentioned as follows:

The Contractor shall provided a Booklet, which consists of a listing of all equipment items (see paragraphs a. and b. below) which are specified to be guaranteed along with the warranty papers for each piece of equipment. Three (3) legible bound copies of the booklet shall be submitted for approval and shall be indexed alphabetically by equipment type. For each specific guaranteed item, the name, address, and telephone number shall be shown on the list for the subcontractor who installed equipment, equipment supplier or distributor, and equipment manufacturer. Completion date of the guarantee period shall correspond to the applicable specification requirements for each guaranteed item. The names of service representatives that will make warranty calls along with the day, night, weekend and holiday contacts for response to a call within the time period specified shall also be identified.

a. For Equipment in Place: The equipment list shall show unit retail value and nameplate data including model number, size, manufacturer, etc. This would include capital equipment and other nonexpendable supplies of a movable nature that are not affixed as an integral part of the facility and may be removed without destroying or reducing the usefulness of the facility. Some examples are spare parts, special tools, manufacturing equipment, maintenance equipment, instruments, installed under this contract.

b. For Installed Building Equipment: The equipment list shall show unit retail value and nameplate data including model number, size, manufacturer,

etc. This would include items of equipment and furnishings (including material for installation thereof), which are required to make the facility usable and are affixed as a permanent part of the structure. Some examples are plumbing fixtures, laboratory counters and cabinets, kitchen equipment, mechanical equipment, electrical equipment, and fire protection systems installed under this contract.

### 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330SUBMITTAL PROCEDURES:

SD-11 Closeout Submittals

Equipment Warranty Booklet

### 1.4 EQUIPMENT WARRANTY IDENTIFICATIONS TAGS

#### 1.4.1 GENERAL REQUIREMENTS

The Contractor shall provide warranty identification tags on all Contractor and government furnished equipment which is Contractor installed.

##### 1.4.1.1 Tags and Information

The tags and information shall be similar in format and size to the exhibits provided by this specification, and shall be suitable for interior and exterior locations, resistant to solvents, abrasion, and to fading caused by sunlight, precipitation, etc. These tags shall have a permanent pressure- sensitive adhesive back, and shall be installed in a position that is easily (or most easily) noticeable. If the equipment surface is not suitable for adhesive back, Contractor shall submit his alternative to the Contracting Officer's Authorized Representative for review and approval. Contractor furnished equipment that has differing warranties on its components will have each component tagged.

##### 1.4.1.2 Tags for Warranted Equipment

The tag for his equipment shall be similar to the following:

EQUIPMENT WARRANTY	
CONTRACTOR FURNISHED EQUIPMENT	
MFG-----	MODEL NO.-----
SERIAL NO.-----	
CONTRACT NO.-----	
CONTRACTOR NAME-----	
CONTRACTOR ADDRESS-----	

CONTRACTOR TELEPHONE-----
CONTRACTOR WARRANTY EXPIRES-----
IN CASE OF WARRANTY ACTION FIRST CONTACT
[DEH] [BCE] AT [TELEPHONE NUMBER]

EQUIPMENT WARRANTY	
GOVERNMENT FURNISHED EQUIPMENT	
MFG _____	MODEL NO. _____
SERIAL NO. _____	
CONTRACT NO. _____	
DATE EQUIP PLACED IN SERVICE _____	

#### 1.4.1.3 Exclusion to Providing Tags

If the manufacturer's name (MFG), model number and serial number are on the manufacturer's equipment data plate and this data plate is easily found and fully legible, this information need not be duplicated on the equipment warranty tag. The Contractor's warranty expiration date and the final manufacturer's warranty expiration date will be determined as specified by the Paragraph "WARRANTY OF CONSTRUCTION".

#### 1.4.2 EXECUTION

The Contractor will complete the required information on each tag and install these tags on the equipment by the time of and as a condition of final acceptance of the equipment. The Contractor shall be responsible for scheduling acceptance inspection with the Contracting Officer (verbal and written notification required). If this inspection is delayed by the Contractor, the Contractor shall, at his own expense, update the in-service and warranty expiration dates on these tags.

#### 1.4.3 Equipment Warranty Tag Replacement

Under the terms of this contract, the Contractor's warranty with respect to work repaired or replaced shall run for one year from the date of repair or replacement. Such activity shall include a data warranty identification tag on the repaired or replaced equipment. The tag shall be furnished and installed by the Contractor, and shall be similar to the original tag, except that it should include the scope of repair and that the contractor's warranty expiration date will be one year from the date of acceptance of the repair or replacement. In the case of repair, the repair only will be covered by the extended warranty. In the case of replacement of a component, the component only will be covered by the extended warranty. In these cases, the original tags will not be removed, but an additional tag



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will be installed for the repair or component replacement.

PART 2 NOT USED

PART 3 NOT USED

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SECTION 01320A

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**08/01; Omaha Rev. 10/01**

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SECTION 01320A

PROJECT SCHEDULE  
**08/01; Omaha Rev. 10/01**

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of the specification to the extent referenced. The publications are referenced in the text by basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

ER 1-1-11 (1995) Progress, Schedules, and Network  
Analysis Systems

1.2 QUALIFICATIONS

The Contractor shall designate an authorized representative who shall be responsible for the preparation of all required project schedule reports.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Pursuant to the Contract Clause, SCHEDULE FOR CONSTRUCTION CONTRACTS, a Project Schedule as described below shall be prepared. The scheduling of construction shall be the responsibility of the Contractor. Contractor management personnel shall actively participate in its development. Subcontractors and suppliers working on the project shall also contribute in developing and maintaining an accurate Project Schedule. The approved Project Schedule shall be used to measure the progress of the work, to aid in evaluating time extensions, and to provide the basis of all progress payments. The scheduler shall be a direct employee of the prime contractor and have a minimum of 2 years experience in scheduling.

3.2 BASIS FOR PAYMENT

The schedule shall be the basis for measuring Contractor progress. Lack of an approved schedule or scheduling personnel will result in an inability of the Contracting Officer to evaluate Contractor's progress for the purposes of payment. Failure of the Contractor to provide all information, as specified below, shall result in the disapproval of the entire Project Schedule submission and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. In the case where Project Schedule revisions have been directed by the Contracting Officer and those revisions have not been included in the Project Schedule, the Contracting Officer may hold retainage up to the maximum allowed by contract, each payment period, until revisions to the Project Schedule have been made.

### 3.3 PROJECT SCHEDULE

The computer software system utilized by the Contractor to produce the Project Schedule shall be capable of providing all requirements of this specification. Failure of the Contractor to meet the requirements of this specification shall result in the disapproval of the schedule. Manual methods used to produce any required information shall require approval by the Contracting Officer.

#### 3.3.1 Use of the Critical Path Method

The Critical Path Method (CPM) of network calculation shall be used to generate the Project Schedule. The Contractor shall provide the Project Schedule in the Precedence Diagram Method (PDM).

#### 3.3.2 Level of Detail Required

The Project Schedule shall include an appropriate level of detail. Failure to develop or update the Project Schedule or provide data to the Contracting Officer at the appropriate level of detail, as specified by the Contracting Officer, shall result in the disapproval of the schedule. The Contracting Officer will use, but is not limited to, the following conditions to determine the appropriate level of detail to be used in the Project Schedule:

##### 3.3.2.1 Activity Durations

Contractor submissions shall follow the direction of the Contracting Officer regarding reasonable activity durations. Reasonable durations are those that allow the progress of activities to be accurately determined between payment periods (usually less than 2 percent of all non-procurement activities' Original Durations are greater than 20 days).

##### 3.3.2.2 Procurement Activities

Tasks related to the procurement of long lead materials or equipment shall be included as separate activities in the project schedule. Long lead materials and equipment are those materials that have a procurement cycle of over 90 days. Examples of procurement process activities include, but are not limited to: submittals, approvals, procurement, fabrication, and delivery.

##### 3.3.2.3 Critical Activities

The following activities shall be listed as separate line activities on the Contractor's project schedule:

- a. Submission and approval of mechanical/electrical layout drawings.
- b. Submission and approval of O & M manuals.
- c. Submission and approval of as-built drawings.
- d. Submission and approval of 1354 data and installed equipment lists.
- e. Submission and approval of testing and air balance (TAB).
- f. Submission of TAB specialist design review report.

- g. Submission and approval of fire protection specialist.
- h. Submission and approval of testing and balancing of HVAC plus commissioning plans and data.
- i. Air and water balance dates.
- j. HVAC commissioning dates.
- k. Controls testing plan.
- l. Controls testing.
- m. Performance Verification testing.
- n. Other systems testing, if required.
- o. Prefinal inspection.
- p. Correction of punchlist from prefinal inspection.
- q. Final inspection.

#### 3.3.2.4 Government Activities

Government and other agency activities that could impact progress shall be shown. These activities include, but are not limited to: approvals, inspections, utility tie-in, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements.

#### 3.3.2.5 Responsibility

All activities shall be identified in the project schedule by the party responsible to perform the work. Responsibility includes, but is not limited to, the subcontracting firm, contractor work force, or government agency performing a given task. Activities shall not belong to more than one responsible party. The responsible party for each activity shall be identified by the Responsibility Code.

#### 3.3.2.6 Work Areas

All activities shall be identified in the project schedule by the work area in which the activity occurs. Activities shall not be allowed to cover more than one work area. The work area of each activity shall be identified by the Work Area Code.

#### 3.3.2.7 Modification or Claim Number

Any activity that is added or changed by contract modification or used to justify claimed time shall be identified by a mod or claim code that changed the activity. Activities shall not belong to more than one modification or claim item. The modification or claim number of each activity shall be identified by the Mod or Claim Number. Whenever possible, changes shall be added to the schedule by adding new activities. Existing activities shall not normally be changed to reflect modifications.

#### 3.3.2.8 Bid Item

All activities shall be identified in the project schedule by the Bid Item

to which the activity belongs. An activity shall not contain work in more than one bid item. The bid item for each appropriate activity shall be identified by the Bid Item Code.

#### 3.3.2.9 Phase of Work

All activities shall be identified in the project schedule by the phases of work in which the activity occurs. Activities shall not contain work in more than one phase of work. The project phase of each activity shall be by the unique Phase of Work Code.

#### 3.3.2.10 Category of Work

All Activities shall be identified in the project schedule according to the category of work which best describes the activity. Category of work refers, but is not limited, to the procurement chain of activities including such items as submittals, approvals, procurement, fabrication, delivery, installation, start-up, and testing. The category of work for each activity shall be identified by the Category of Work Code.

#### 3.3.2.11 Feature of Work

All activities shall be identified in the project schedule according to the feature of work to which the activity belongs. Feature of work refers, but is not limited to, a work breakdown structure for the project. The feature of work for each activity shall be identified by the Feature of Work Code.

### 3.3.3 Scheduled Project Completion

The schedule interval shall extend from NTP to the contract completion date.

#### 3.3.3.1 Project Start Date

The schedule shall start no earlier than the date on which the NTP was acknowledged. The Contractor shall include as the first activity in the project schedule an activity called "Start Project". The "Start Project" activity shall have an "ES" constraint date equal to the date that the NTP was acknowledged, and a zero day duration.

#### 3.3.3.2 Constraint of Last Activity

Completion of the last activity in the schedule shall be constrained by the contract completion date. Calculation on project updates shall be such that if the early finish of the last activity falls after the contract completion date, then the float calculation shall reflect a negative float on the critical path. The Contractor shall include as the last activity in the project schedule an activity called "End Project". The "End Project" activity shall have an "LF" constraint date equal to the completion date for the project, and a zero day duration.

#### 3.3.3.3 Early Project Completion

In the event the project schedule shows completion of the project prior to the contract completion date, the Contractor shall identify those activities that have been accelerated and/or those activities that are scheduled in parallel to support the Contractor's "early" completion. Contractor shall specifically address each of the activities noted in the narrative report at every project schedule update period to assist the Contracting Officer in evaluating the Contractor's ability to actually



complete prior to the contract period.

#### 3.3.4 Interim Completion Dates

Contractually specified interim completion dates shall also be constrained to show negative float if the early finish date of the last activity in that phase falls after the interim completion date.

##### 3.3.4.1 Start Phase

The Contractor shall include as the first activity for a project phase an activity called "Start Phase X" where "X" refers to the phase of work. The "Start Phase X" activity shall have an "ES" constraint date equal to the date on which the NTP was acknowledged, and a zero day duration.

##### 3.3.4.2 End Phase

The Contractor shall include as the last activity in a project phase an activity called "End Phase X" where "X" refers to the phase of work. The "End Phase X" activity shall have an "LF" constraint date equal to the completion date for the project, and a zero day duration.

##### 3.3.4.3 Phase X

The Contractor shall include a hammock type activity for each project phase called "Phase X" where "X" refers to the phase of work. The "Phase X" activity shall be logically tied to the earliest and latest activities in the phase.

#### 3.3.5 Default Progress Data Disallowed

Actual Start and Finish dates shall not be automatically updated by default mechanisms that may be included in CPM scheduling software systems. Actual Start and Finish dates on the CPM schedule shall match those dates provided from Contractor Quality Control Reports. Failure of the Contractor to document the Actual Start and Finish dates on the Daily Quality Control report for every in-progress or completed activity, and failure to ensure that the data contained on the Daily Quality Control reports is the sole basis for schedule updating shall result in the disapproval of the Contractor's schedule and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. Updating of the percent complete and the remaining duration of any activity shall be independent functions. Program features which calculate one of these parameters from the other shall be disabled.

#### 3.3.6 Out-of-Sequence Progress

Activities that have posted progress without all preceding logic being satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case approval of the Contracting Officer. The Contractor shall propose logic corrections to eliminate all out of sequence progress or justify not changing the sequencing for approval prior to submitting an updated project schedule.

#### 3.3.7 Negative Lags

Lag durations contained in the project schedule shall not have a negative value.

### 3.4 PROJECT SCHEDULE SUBMISSIONS

The Contractor shall provide the submissions as described below. The data disk, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS.

#### 3.4.1 Preliminary Project Schedule Submission

The Preliminary Project Schedule, defining the Contractor's planned operations for the first 60 calendar days shall be submitted for approval within 20 calendar days after the NTP is acknowledged. The approved preliminary schedule shall be used for payment purposes not to exceed 60 calendar days after NTP.

#### 3.4.2 Initial Project Schedule Submission

The Initial Project Schedule shall be submitted for approval within 40 calendar days after NTP. The schedule shall provide a reasonable sequence of activities which represent work through the entire project and shall be at a reasonable level of detail.

#### 3.4.3 Monthly Schedule Updates

Based on the result of progress meetings, specified in "Monthly Progress Meetings," the Contractor shall submit monthly schedule updates. These submissions shall enable the Contracting Officer to assess Contractor's progress. If the Contractor fails or refuses to furnish the information and project schedule data, which in the judgement of the Contracting Officer or authorized representative is necessary for verifying the Contractor's progress, the Contractor shall be deemed not to have provided an estimate upon which progress payment may be made.

#### 3.4.4 Standard Activity Coding Dictionary

The Contractor shall use the activity coding structure defined in the Standard Data Exchange Format (SDEF) in ER 1-1-11, Appendix A. This exact structure is mandatory, even if some fields are not used.

### 3.5 SUBMISSION REQUIREMENTS

The following items shall be submitted by the Contractor for the preliminary submission, initial submission, and every monthly project schedule update throughout the life of the project:

#### 3.5.1 Data Disks

Two data disks containing the project schedule shall be provided. Data on the disks shall adhere to the SDEF format specified in ER 1-1-11, Appendix A.

##### 3.5.1.1 File Medium

Required data shall be submitted on 3.5 disks, formatted to hold 1.44 MB of data, compatible with Microsoft Windows 95/98 operating systems, unless otherwise approved by the Contracting Officer.

##### 3.5.1.2 Disk Label

A permanent exterior label shall be affixed to each disk submitted. The

label shall indicate the type of schedule (Preliminary, Initial, Update, or Change), full contract number, project name, project location, data date, name and telephone number or person responsible for the schedule.

#### 3.5.1.3 File Name

Each file submitted shall have a name related to either the schedule data date, project name, or contract number. The Contractor shall develop a naming convention that will ensure that the names of the files submitted are unique. The Contractor shall submit the file naming convention to the Contracting Officer for approval.

#### 3.5.2 Narrative Report

A Narrative Report shall be provided with the preliminary, initial, and each update of the project schedule. This report shall be provided as the basis of the Contractor's progress payment request. The Narrative Report shall include: a description of activities along the 2 most critical paths, a description of current and anticipated problem areas or delaying factors and their impact, and an explanation of corrective actions taken or required to be taken. The narrative report is expected to relay to the Government, the Contractor's thorough analysis of the schedule output and its plans to compensate for any problems, either current or potential, which are revealed through that analysis.

#### 3.5.3 Approved Changes Verification

Only project schedule changes that have been previously approved by the Contracting Officer shall be included in the schedule submission. The Narrative Report shall specifically reference, on an activity by activity basis, all changes made since the previous period and relate each change to documented, approved schedule changes.

#### 3.5.4 Schedule Reports

The format for each activity for the schedule reports listed below shall contain: Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date, Total Float. Actual Start and Actual Finish Dates shall be printed for those activities in progress or completed.

##### 3.5.4.1 Activity Report

A list of all activities sorted according to activity number.

##### 3.5.4.2 Logic Report

A list of Preceding and Succeeding activities for every activity in ascending order by activity number. Preceding and succeeding activities shall include all information listed above in paragraph Schedule Reports. A blank line shall be left between each activity grouping.

##### 3.5.4.3 Total Float Report

A list of all incomplete activities sorted in ascending order of total float. Activities which have the same amount of total float shall be listed in ascending order of Early Start Dates. Completed activities shall not be shown on this report.

#### 3.5.4.4 Earnings Report

A compilation of the Contractor's Total Earnings on the project from the NTP until the most recent Monthly Progress Meeting. This report shall reflect the Earnings of specific activities based on the agreements made in the field and approved between the Contractor and Contracting Officer at the most recent Monthly Progress Meeting. Provided that the Contractor has provided a complete schedule update, this report shall serve as the basis of determining Contractor Payment. Activities shall be grouped by bid item and sorted by activity numbers. This report shall: sum all activities in a bid item and provide a bid item percent; and complete and sum all bid items to provide a total project percent complete. The printed report shall contain, for each activity: the Activity Number, Activity Description, Original Budgeted Amount, Total Quantity, Quantity to Date, Percent Complete (based on cost), and Earnings to Date.

#### 3.5.5 Network Diagram

The network diagram shall be required on the initial schedule submission and on monthly schedule update submissions. The network diagram shall depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

##### 3.5.5.1 Continuous Flow

Diagrams shall show a continuous flow from left to right with no arrows from right to left. The activity number, description, duration, and estimated earned value shall be shown on the diagram.

##### 3.5.5.2 Project Milestone Dates

Dates shall be shown on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

##### 3.5.5.3 Critical Path

The critical path shall be clearly shown.

##### 3.5.5.4 Banding

Activities shall be grouped to assist in the understanding of the activity sequence. Typically, this flow will group activities by category of work, work area and/or responsibility.

##### 3.5.5.5 S-Curves

Earnings curves showing projected early and late earnings and earnings to date.

#### 3.6 PERIODIC PROGRESS MEETINGS

Progress meetings to discuss payment shall include a monthly onsite meeting or other regular intervals mutually agreed to at the preconstruction conference. During this meeting the Contractor shall describe, on an activity by activity basis, all proposed revisions and adjustments to the project schedule required to reflect the current status of the project. The Contracting Officer will approve activity progress, proposed revisions,

and adjustments as appropriate.

#### 3.6.1 Meeting Attendance

The Contractor's Project Manager and Scheduler shall attend the regular progress meeting.

#### 3.6.2 Update Submission Following Progress Meeting

A complete update of the project schedule containing all approved progress, revisions, and adjustments, based on the regular progress meeting, shall be submitted not later than 4 working days after the monthly progress meeting.

#### 3.6.3 Progress Meeting Contents

Update information, including Actual Start Dates, Actual Finish Dates, Remaining Durations, and Cost-to-Date shall be subject to the approval of the Contracting Officer. As a minimum, the Contractor shall address the following items on an activity by activity basis during each progress meeting.

##### 3.6.3.1 Start and Finish Dates

The Actual Start and Actual Finish dates for each activity currently in-progress or completed .

##### 3.6.3.2 Time Completion

The estimated Remaining Duration for each activity in-progress. Time-based progress calculations shall be based on Remaining Duration for each activity.

##### 3.6.3.3 Cost Completion

The earnings for each activity started. Payment will be based on earnings for each in-progress or completed activity. Payment for individual activities will not be made for work that contains quality defects. A portion of the overall project amount may be retained based on delays of activities.

##### 3.6.3.4 Logic Changes

All logic changes pertaining to NTP on change orders, change orders to be incorporated into the schedule, contractor proposed changes in work sequence, corrections to schedule logic for out-of-sequence progress, lag durations, and other changes that have been made pursuant to contract provisions shall be specifically identified and discussed.

##### 3.6.3.5 Other Changes

Other changes required due to delays in completion of any activity or group of activities include: 1) delays beyond the Contractor's control, such as strikes and unusual weather. 2) delays encountered due to submittals, Government Activities, deliveries or work stoppages which make re-planning the work necessary. 3) Changes required to correct a schedule which does not represent the actual or planned prosecution and progress of the work.

#### 3.7 REQUESTS FOR TIME EXTENSIONS

In the event the Contractor requests an extension of the contract completion date, or any interim milestone date, the Contractor shall furnish the following for a determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract: justification, project schedule data, and supporting evidence as the Contracting Officer may deem necessary. Submission of proof of delay, based on revised activity logic, duration, and costs (updated to the specific date that the delay occurred) is obligatory to any approvals.

#### 3.7.1 Justification of Delay

The project schedule shall clearly display that the Contractor has used, in full, all the float time available for the work involved with this request.

The Contracting Officer's determination as to the number of allowable days of contract extension shall be based upon the project schedule updates in effect for the time period in question, and other factual information. Actual delays that are found to be caused by the Contractor's own actions, which result in the extension of the schedule, will not be a cause for a time extension to the contract completion date.

#### 3.7.2 Submission Requirements

The Contractor shall submit a justification for each request for a change in the contract completion date of under 2 weeks based upon the most recent schedule update at the time of the NTP or constructive direction issued for the change. Such a request shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, as a minimum:

- a. A list of affected activities, with their associated project schedule activity number.
- b. A brief explanation of the causes of the change.
- c. An analysis of the overall impact of the changes proposed.
- d. A sub-network of the affected area.

Activities impacted in each justification for change shall be identified by a unique activity code contained in the required data file.

#### 3.7.3 Additional Submission Requirements

For any requested time extension of over 2 weeks, the Contracting Officer may request an interim update with revised activities for a specific change request. The Contractor shall provide this disk within 4 days of the Contracting Officer's request.

#### 3.8 DIRECTED CHANGES

If the NTP is issued for changes prior to settlement of price and/or time, the Contractor shall submit proposed schedule revisions to the Contracting Officer within 2 weeks of the NTP being issued. The proposed revisions to the schedule will be approved by the Contracting Officer prior to inclusion of those changes within the project schedule. If the Contractor fails to submit the proposed revisions, the Contracting Officer may furnish the Contractor with suggested revisions to the project schedule. The Contractor shall include these revisions in the project schedule until revisions are submitted, and final changes and impacts have been negotiated. If the Contractor has any objections to the revisions

furnished by the Contracting Officer, the Contractor shall advise the Contracting Officer within 2 weeks of receipt of the revisions. Regardless of the objections, the Contractor shall continue to update the schedule with the Contracting Officer's revisions until a mutual agreement in the revisions is reached. If the Contractor fails to submit alternative revisions within 2 weeks of receipt of the Contracting Officer's proposed revisions, the Contractor will be deemed to have concurred with the Contracting Officer's proposed revisions. The proposed revisions will then be the basis for an equitable adjustment for performance of the work.

### 3.9 OWNERSHIP OF FLOAT

Float available in the schedule, at any time, shall not be considered for the exclusive use of either the Government or the Contractor.

-- End of Section --

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SECTION 01330

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**09/01; Omaha Update 10/01**

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SECTION 01330

SUBMITTAL PROCEDURES  
**09/01; Omaha Update 10/01**

PART 1 GENERAL

Attachments: Submittal Register  
ENG Form 4025, Transmittal Form

1.1 SUMMARY

This section includes administrative and procedural requirements for construction submittals presented by the Contractor after 100% corrected plans and specifications have been accepted by the government. This section also includes requirements for developing, submitting and maintaining a "Submittal Register".

1.2 CONTRACTOR RESPONSIBILITIES

The Contractor is responsible for total management of his work including approval, scheduling, control, and certification of all submittals. The submittal management system provided in these specifications is intended to be a complete system for the Contractor to use to control the quality of materials, equipment and workmanship provided by manufacturers, fabricators, suppliers and subcontractors. The Contractor shall review each submittal for contract compliance. The Submittal Register (ENG Form 4288) will be utilized to log and monitor all submittal activities. No construction or installation activities shall be performed prior to required approvals of applicable submittals. The Contractor shall perform a check to assure that all materials and/or equipment have been tested, submitted and approved during the preparatory phase of quality control inspections. The Contractor shall coordinate all submittals with the Contractor's Designer (A-E). Approval by the Contractor's Designer means that the submittal is in compliance with the Construction Set design submittal.

1.3 SUBMITTAL IDENTIFICATION (SD)

Submittals required are identified by SD numbers and titles as follows:

SD-01 Preconstruction Submittals

Tabular lists showing location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work.

In addition, the following items are included:

Construction Progress Schedule  
Health and safety plan  
Work plan

Quality control plan  
Environmental protection plan  
Permits

#### SD-02 Shop Drawings

Submittals which graphically show relationship of various components of the work, schematic diagrams of systems, details of fabrication, layouts of particular elements, connections, and other relational aspects of the work.

#### SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

#### SD-04 Samples

Samples, including both fabricated and unfabricated physical examples of materials, products, and units of work as complete units or as portions of units of work.

Physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged. Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.

Field samples and mock-ups constructed on the project site establish standards by which the ensuring work can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.

#### SD-05 Design Data

Calculations, mix designs, analyses or other data pertaining to a part of work.

#### SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. (Testing must have been within three years of date of contract award for the project.)

Report which includes findings of a test required to be performed by the contractor on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports

Daily checklists

Final acceptance test and operational test procedure

SD-07 Certificates

A document, required of the Contractor, or through the Contractor, from a supplier, installer, manufacturer, or other lower tier Contractor, the purpose of which is to confirm the quality or orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel, qualifications, or other verifications of quality.

Statement signed by an official authorized to certify on behalf of the manufacturer of a product, system or material, attesting that the product, system or material meets specified requirements. The statement must be dated after the award of the contract, must state the Contractor's name and address, must name the project and location, and must list the specific requirements which are being certified.

Confined space entry permits.

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and material safety data sheets, if any, concerning impedances, hazards, and safety precautions.

SD-09 Manufacturer's Field Reports

Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

Factory test reports.

SD-10 Operation and Maintenance Data

Data intended to be incorporated in operations and maintenance manuals.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

In addition, the following items are included:

As-built drawings

Special warranties

Posted operating instructions

Training plan

1.4 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.4.1 Designer Approved ("G-AE")

Designer approval is required for extensions of design, critical materials, deviations, any deviations from the solicitation, the accepted proposal, or the completed design, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings." All submittals noted in the technical specifications and Submittal Register as "G-AE" are subject to approval by the Contractor's Designer, prior to submittal to the Government. The Contracting Officer has the option to review any submittal. The Government will review all "G-AE" submittals for conformance to the solicitation and all submittals designated as variations from the Solicitation or 100% corrected design or as directed by the Contracting Officer.

#### 1.4.2 Government Approved Construction Submittals ("G-RE")

"G-RE" submittals subject to Government approval are those so designated by the Contracting Officer during the design process or preconstruction meeting. All "G-RE" submittals shall be reviewed and approved by the Contractor's Quality Control Representative and the Contractor's Designer prior to submittal to the Government. Within the terms of the Contract Clause entitled "Specification and Drawings for Construction," they are considered to be "shop drawings." Any variance must clearly identify the variance as specified in paragraph: "Variations", below.

#### 1.4.3 Government Reviewed Submittals

Government review is required for designated "G-RE" submittals and variations from the the solicitation requirements and completed design. Review will be only for conformance with the contract requirements. This also includes those construction submittals for which the design documents did not include enough detail to ascertain contract compliance. Government review will not include development of design calculations or other means of determining adequacy of design. The Contractor and his designer retains the sole responsibility for adequacy of design.

#### 1.4.4 Information Only (FIO)

All submittals not requiring Contractor's Designer or Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above. The Contracting Officer has the option to review any submittal.

#### 1.5 GOVERNMENT REVIEWED SUBMITTALS

The Contracting Officer's review of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information appear to meet the Solicitation requirements. Government Review will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Design and CQC requirements of this contract is responsible for design, compliance with design criteria required in the solicitation, dimensions, all design extensions, such as the design of adequate connections and details, etc. and the satisfactory construction of all work. After submittals have been reviewed for conformance or approval, as applicable, by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless

accompanied by an explanation of why a substitution is necessary.

#### 1.6 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer, obtain the Contractor's Designer approval and Government approval, when applicable, and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. Any submittal found to contain errors or unapproved variations from the solicitation or accepted proposal, shall be resubmitted as one requiring "approval" action, requiring both Designer's approval and Government conformance review or approval, as applicable. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause "Changes" shall be given promptly to the Contracting Officer.

#### 1.7 WITHHOLDING OF PAYMENT

No Payment for materials incorporated in the work will be made if all required Designer or Contractor Quality Control Representative approvals or required Government conformance reviews or approvals, as applicable, have not been obtained. No payment will be made for any materials incorporated in the work for any conformance review submittals or information only submittals found to contain errors or deviations from the Solicitation or Accepted Proposal.

#### 1.8 GENERAL

The Contractor shall make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. The Contractor's Quality Control (CQC) representative, and the Designer, as applicable, shall check, approve and stamp, sign, and date each item, indicating action taken. Proposed variations from the solicitation (contract requirements) or accepted 100% corrected design shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring conformance review or approval by the Government shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

#### 1.9 SUBMITTAL REGISTER AND ENG FORM 4288 (RMS) SUBMITTAL REGISTER

The Contractor's Designer(s) shall develop a complete list of submittals during design. The Designer shall identify required submittals in the specifications. The list is to be used in preparing Submittal Register as approved by the Contracting Officer Representative. The example Submittal Register furnished with the Solicitation was created using Specsintact Software. The Contractor shall replace this example Submittal Register with the actual submittal register for the completed design specifications. The list is not all inclusive and additional submittals may be required. The attached and Contractor generated submittal register identifies only the submittal section, type of submittal, description of item submitted, paragraph number related to submittal item (section submittal paragraph if none listed), submittal classification (G), and submittal reviewer identifier (AE or RE). Any submittal without a submittal classification and submittal reviewer identifier is considered to be For Information Only (FIO). The submittal register generated by the Government Resident Management System (RMS) Software is used for tracking construction submittals and is referred to as ENG Form 4288 (RMS). Much of the same information contained on the Contractor generated submittal register will be included on the ENG Forms 4288 (RMS). The Contractor shall maintain a ENG Form 4288 (RMS) for the project in accordance with the attached ENG Form 4288 (RMS) Instructions. The Contractor will be furnished one (1) set of ENG Forms 4288 (RMS) at the preconstruction conference on which will be listed each item of equipment and material of each type for which fabricators' drawings, and/or related descriptive data, test reports, samples, spare parts lists, O&M manuals, or other types of submittals are required by the completed project specifications. The Contractor shall complete the appropriate columns as indicated on the attached ENG Form 4288 (RMS) Instructions and return six (6) completed copies to the Contracting Officer for acceptance within 20 calendar days after the preconstruction conference. Upon acceptance of the ENG Form 4288 (RMS) by the Contracting Officer, the ENG Form 4288 (RMS) will serve as a scheduling document for submittals and will be used to control submittal actions throughout the contract period. The ENG Form 4288 (RMS) ACTIVITY NO. is filled in when a network analysis system is a contract requirement. The TRANSMITTAL NO. and ITEM NO. shall be left blank and used later to record the respective transmittal and item number corresponding to those listed on the transmittal form entitled: "TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE" (ENG Form 4025). The approved ENG Form 4288 (RMS) will become the scheduling document and will be used to control submittals throughout the life of the contract. The submittal register and the progress schedules shall be coordinated. Updates to the submittal register showing the Contractor action codes and actual dates shall be submitted monthly or until all submittals have been satisfactorily completed. When the progress schedule is revised, the ENG Form 4288 (RMS) shall also be revised and both submitted for approval.

#### 1.10 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 20 calendar days exclusive of mailing time) shall be allowed and shown on the register for conformance reviews by the Contracting Officer for submittals requiring Government approval and for submittals which vary from the solicitation or accepted 100% corrected design. No delay damages or time extensions will be allowed for time lost in late submittals.

#### 1.11 TRANSMITTAL FORM (ENG FORM 4025)

The sample transmittal form (ENG Form 4025) attached to this section shall be used for submitting all submittals in accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

#### 1.12 SUBMITTAL PROCEDURES

Submittals shall be made as follows:

##### 1.12.1 Procedures

##### 1.12.1.1 "G-AE" Submittals

All "G-AE" submittals shall be reviewed and approved by the Contractor's Quality Control Representative and Contractor's Designer prior to submittal to the Government. A conformance review is required by the Government on all "G-AE" submittals, prior to construction of the related items.

Except as noted below, data for all items listed as "G-AE" Submittals in the various sections shall be submitted in five (copies), except for the additional copies specified below. All five copies shall be submitted to the Area Engineer using the transmittal form. Items not to be submitted in multiples, such as samples and test cylinders, shall be submitted to the Area or Resident Engineer (as directed), accompanied by five (5) copies of the transmittal form. An additional copy of each "G-AE" submittals shall be submitted to: Omaha District (CENWO-ED-DI)- one (1) copy and Construction Division (CENWO-CD-QT)- one (1) copy, using the transmittal form.

Each required submittal, which is in the form of a drawing, shall be submitted as five (5) prints of the drawing. Drawing prints shall be either blue or black line permanent-type prints on a white background or blueprint and shall be sufficiently clear and suitable for making legible copies.

Catalog cuts and other descriptive data which have more than one model, size, or type or which shows optional equipment shall be clearly marked to show the model, size, or type and all optional equipment which is provided.

Submittals on component items forming a system or that are interrelated shall be submitted at one time as a single submittal in order to demonstrate that the items have been properly coordinated and will function as a unit.

##### 1.12.1.2 "G-RE" and FIO Submittals

Except as noted below, data for all items listed as "G-RE" Submittals in the various sections shall be submitted in five (5) copies. All five copies shall be submitted to the Area Engineer for review and approval using the transmittal form. Items not to be submitted in multiples, such as samples and test cylinders, shall be submitted to the Area or Resident Engineer (as directed) accompanied by five (5) copies of the transmittal



form.

All "G-RE" and "FIO" submittals shall be reviewed and approved by the Contractor's Quality Control Representative and Contractor's Designer (as applicable) prior to submittal to the Government. Government Approval is required on all "G-RE" submittals, prior to construction of the related items.

The Government has the option to review any For Information Only submittals.

#### 1.12.1.3 Certificates of Compliance

Each certificate shall be signed by an official authorized to certify in behalf of the manufacturing company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Contractor from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet the specific requirements.

#### 1.12.1.4 Purchase Orders

Copies of purchase orders shall be furnished to the Contracting Officer when the Contractor requests assistance for expediting deliveries of equipment or materials, or when requested by the Contracting Officer for the purpose of quality assurance review. Each purchase order issued by the Contractor or his subcontractors for materials and equipment to be incorporated into the project shall (1) be clearly identified with the applicable DA contract number, (2) carry an identifying number, (3) be in sufficient detail to identify the material being purchased, (4) indicate a definite delivery date, and (5) display the DMS priority rating, if applicable.

#### 1.12.1.5 Operation and Maintenance Instructions and/or Manuals

Where required by various technical sections, operations and maintenance instructions and/or manuals with parts lists included shall be provided by the Contractor in quintuplicate, unless otherwise specified, and shall be assembled in three-ring binders with index and tabbed section divider and having a cover indicating the contents by equipment or system name and project title and shall be submitted to the Area Engineer for approval (after approval by the Contractor's Quality Control Representative), 90 days prior to final tests of mechanical and electrical systems, unless otherwise specified. Each operation and maintenance manual shall contain a copy of all warranties. If field testing requires these copies to be revised, they shall be updated and resubmitted for approval within 10 calendar days after completion of tests. The Operations and Maintenance Instructions and/or Manuals shall be shown as a separate activity on the Contractor prepared construction schedule bar chart or network analysis system.

#### 1.12.1.6 Interior/Exterior Finish Sample and Data

All submittals for interior finish samples and data shall be submitted concurrently and all submittals for exterior finish samples and data shall be submitted concurrently.

#### 1.12.2 Variations

Variations from the solicitation (contract requirements) or the accepted 100% corrected design must be approved by the Contractor's Designer, Contractor's Quality Control Representative and Contracting Officer. For submittals which include proposed variations, the column "variation" of ENG Form 4025 shall be checked and a serial letter shall be simultaneously prepared and sent to the Area Engineer referencing this variation. The Contractor shall set forth in writing the reason for any variations and clearly annotate such variations on the submittal. The narrative shall include documentation of the nature and features of the variation and why the variation is desirable and beneficial to the Government. When submitting a variation for acceptance, the Contractor warrants that the contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of the work. The Contractor shall take actions and bear the additional costs, including review costs by the Government, necessary due to the proposed variation. In addition to the submittal review period specified above, allow ten (10) additional working days for consideration by the Government of submittals with variations. The Government reserves the right to rescind inadvertent acceptance of submittals containing unnoted variations.

#### 1.13 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

#### 1.14 SUBMITTALS (FINAL COPY)

Upon completion of review of submittals requiring Government conformance review or approval, the submittals will be identified as having received satisfactory review by being so stamped and dated.

##### 1.14.1 "G-AE" Submittals

The Contracting Officer has the option to review any submittal. Two (2) copies of "G-AE" submittals, for conformance review by the Government, will be returned to the Contractor, except for samples, test cylinders, and O&M manuals for which two (2) copies of the transmittal form only will be returned to the Contractor. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. All "G-AE" submittals shall be reviewed and approved by the Contractor's Designer and Contractor's Quality Control Representative prior to submittal to the Government.

##### 1.14.2 "G-RE" Submittals

Two (2) copies of "G-RE" submittals for approval will be returned to the Contractor except for samples, test cylinders, and O&M manuals for which two (2) copies of the transmittal form only will be returned to the Contractor.

#### 1.15 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals.

The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

1.16 STAMPS

Stamps used by the Contractor's Designer and the Contractor's designated Quality Control person on the submittal data to certify that the submittal meets contract requirements shall be similar to the following (use two stamps for submittals reviewed by both):

CONTRACTOR	
(Firm Name)	
_____	Approved
_____ Approved with corrections as noted on submittal data and/or attached sheets(s).	
SIGNATURE: _____	
TITLE: _____	
DATE: _____	

INSTRUCTIONS  
ENG FORM 4288 (RMS)

1. The Contractor shall utilize the ENG Form 4288 (RMS) generated by the Government Residential Management System (RMS) software for tracking construction submittals. The Submittal Register information, columns (c) thru (f) from the Contractor generated Submittal Register, will be utilized by the Government to generate the ENG Form 4288 (RMS). The Government will furnish the Contractor a hard copy of the ENG Form 4288 (RMS) at the preconstruction conference. . The ENG Form 4288 (RMS) includes the following items and parties responsible for completing the information required on the ENG Form 4288 (RMS):

a. Activity Number: will be provided by the Contractor from his Network Analysis, if required, and when a network analysis is accepted.

b. Transmittal Number and Item Number: will be provided by the Contractor from ENG Form 4025 for each item.

c. Specification Paragraph Number: will be provided by the Contractor from the Submittal Register from column entitled "Specification Paragraph Number".

d. Description of Submittal: will be provided by the Contractor from the Submittal Register from column entitled "Description of Item Submitted".

e. Type of Submittal: will be provided by the Contractor from the Submittal Register from column entitled "Type of Submittal" or "Description of Item Submitted".

f. Classification: will be provided by the Contractor from the Submittal Register from column entitled "Classification".

g. Reviewing Office - Reviewer: will be provided by the Contractor from the Submittal Register from column entitled "Classification" or "Reviewer".

h. Contractor Schedule Dates: the Contractor will provide schedule dates for

"Submit Needed By" (Date the Contractor expects to submit an item. It is the Contractors responsibility to calculate the lead time needed for the government approval. Note if resubmittal is required it is the Contractors responsibility to make all adjustments necessary to meet the contract completion date.)

"Approval Needed By" (date the Contractor can receive approval and still obtain the material by need date.), and

"Material Needed By" (date that the material is needed at the site. If there is a network analysis it should reflect that date on the analysis.)

i. Contractor Action: Includes the following items: "Code" and "Submit to the Corps". These items will be completed by the Contractor and/or Contractor's Designer. The action codes will be one of the following:

A - Approved as submitted.

B - Approved, except as noted.

C - Approved, except as noted. Refer to attached sheet resubmission required.

G - Other (specify)

j. Government Action: This item includes a Government Action "Code" and "Date" and is reserved for Government use. The Government reserves the right to review any submittal for contract compliance. Receipt of an Action Code "F - Receipt Acknowledged" or failure of the Contractor to receive an Action Code by the Government, does not mean that the submittal is in compliance with the contract requirements. When used by the Government, the action code will be one of the following:

A - Approved as submitted.

B - Approved except as noted on drawings.

C - Approved, except as noted on drawings. Refer to attached \_\_\_\_ sheet resubmission required.

D - Will be returned by separate correspondence.

E - Disapproved (See Attached).

F - Receipt Acknowledged.

Fx - Receipt acknowledged, does not comply as noted with contract requirements.

G - Other (specify).

2. Reviewer Abbreviation code will be as follows;

G-AE - Approved by Contractor's Designer, Contractor's Quality Control Representative and Conformance Review by the Government, as applicable. Approval by the Contractor's Designer means that the submittal complies with Construction Set design submittal.

G-RE - Approved by Contractor's Quality Control Representative and Designer and approved by the Government.

For Information Only - All other submittals without a G-RE or G-AE abbreviation code, Approved by Contractors Quality Control Representative and/or Designer. The Government reserves the right review any submittal for conformance with the solicitation.

INSTRUCTIONS  
ENG FORM 4025

1. DATE at the top of form will be the date submitted to the DOR which is to be completed by the Contractor.
2. TRANSMITTAL NO. Each new transmittal (i.e. G-AE, G-ED, G-RE or FIO) shall be numbered consecutively in the space provided in "Transmittal No.". This number will be the identifying symbol for each submittal. Example: "G-ED-001", "G-AE-002" "G-RE-003", "FIO-004", etc. For each new submittal or for a resubmittal, the appropriate box must be marked. Resubmittals must be designated by their original sequential number followed by an ".1", ".2", etc. for each sequential resubmittal. Example: "G-ED-001.1" (previous submittal No. G-ED-001).
3. TO: Box will contain the name and address of the office which will review the submittal. The name and address should be given in paragraph 3.5. Contractor is to complete this box after reviewing the classification provided by the government on Eng Form 4288 column f and determining the proper address.
4. FROM: Box will be the name and address of the Contractor. Contractor is to complete this box.
5. CONTRACT NO. box will contain the Contractors construction contract number (e.g., DACXXX-XX-C-XXXX).
6. CHECK ONE box will be completed by the Contractor with one box marked. If a resubmittal is provided last transmittal number will be added.
7. SPECIFICATION SECTION NO. box will be completed by the Contractor. The number will be the five digit number found in the specifications. No more than one section will be covered with each transmittal.
8. PROJECT TITLE AND LOCATION box will be completed by the Contractor.
9. Column a, will be completed by the Contractor and will contain a different number for each item submitted in that transmittal. Once a number is assigned to an item it will remain the same even if there is a resubmittal.
10. Column b, will be completed by the Contractor. The description of each item on this form will include the descriptions provided on the submittal register plus any other data necessary to describe the item. The Contractor shall submit each submittal register item all at once on one transmittal if possible. If a submittal register item can not be submitted all at once Contractor should note that in the remarks box. If a submittal register item requires several items, description shall contain submittal register description plus any additional specific descriptions. Additional items not on the submittal register will be noted in the remarks box.
11. Column c, will be completed by the Contractor. The information will be the appropriate submittal description number as described this Section or shown on the submittal register (e.g. SD-XX).
12. Column d, will be completed by the Contractor. The number of copies will be determined by the Contractor after review of submittal register for the classification of the item and after review of paragraph: SUBMITTAL

PROCEDURES of this Section.

13. Column e, will be completed by the Contractor. The Contractor shall state all applicable paragraph numbers.

14. Column f, will be completed by the Contractor. The Contractor shall state all applicable drawing sheet numbers.

15. Column g, will be completed by the Contractor and/or Contractor's Designer. The action codes will be one of the following:

- A - Approved as submitted.
- B - Approved, except as noted.
- C - Approved, except as noted. Refer to attached sheet resubmission required.
- G - Other (specify)

16. Column h, will be completely by the Contractor. A check shall be placed in this column when a submittal is not in accordance with the plans and specifications also, a written statement to that effect shall be included in the space provided for "Remarks".

17. Column i, is reserved for Government use and may or may not be provided. When used by the Government, the action code will be one of the following:

- A - Approved as submitted.
- B - Approved except as noted on drawings.
- C - Approved, except as noted on drawings. Refer to attached \_\_\_\_ sheet resubmission required.
- D - Will be returned by separate correspondence.
- E - Disapproved (See Attached).
- F - Receipt Acknowledged.
- Fx - Receipt acknowledged, does not comply as noted with contract requirements.
- G - Other (specify).

18. REMARKS box self explained.

19. Contractor must sign all Eng Form 4025 certifying conformance.

20. Section II will be completed by the Contractor, unless approval is required by the Government.

See reverse side of ENG Form 4025 for additional instructions.

-- End of Section --



<p align="center"><b>SUBMITTAL REGISTER</b></p>	<p>CONTRACT NO.</p>
---	---------------------

CONTRACT NO.
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<b>TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE</b> <i>(Read instructions on the reverse side prior to initiating this form)</i>	DATE	TRANSMITTAL NO.
---	------	-----------------

**SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS** *(This section will be initiated by the contractor)*

TO:	FROM:	CONTRACT NO.	CHECK ONE: <input type="checkbox"/> THIS IS A NEW TRANSMITTAL <input type="checkbox"/> THIS IS A RESUBMITTAL OF TRANSMITTAL _____
-----	-------	--------------	--

SPECIFICATION SEC. NO. <i>(Cover only one section with each transmittal)</i>	PROJECT TITLE AND LOCATION	CHECK ONE: THIS TRANSMITTAL IS FOR <input type="checkbox"/> FIO <input type="checkbox"/> GOV'T. APPROVAL
--	----------------------------	---

ITEM NO.	DESCRIPTION OF ITEM SUBMITTED <i>(Type size, model number/etc.)</i>	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. <i>(See instruction no. 8)</i>	NO. OF COPIES	CONTRACT REFERENCE DOCUMENT		FOR CONTRACTOR USE CODE	VARIATION <i>(See instruction No. 6)</i>	FOR CE USE CODE
				SPEC. PARA. NO. <i>e.</i>	DRAWING SHEET NO. <i>f.</i>			
<i>a.</i>	<i>b.</i>	<i>c.</i>	<i>d.</i>	<i>e.</i>	<i>f.</i>	<i>g.</i>	<i>h.</i>	<i>i.</i>

REMARKS	I certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as other wise stated.  _____ NAME AND SIGNATURE OF CONTRACTOR
---------	---

**SECTION II - APPROVAL ACTION**

ENCLOSURES RETURNED <i>(List by Item No.)</i>	NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY	DATE
---	--	------

## INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.
2. Each transmittal shall be numbered consecutively in the space provided for "Transmittal No.". This number, in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.
3. The "Item No." will be the same "Item No." as indicated on ENG FORM 4288-R for each entry on this form.
4. Submittals requiring expeditious handling will be submitted on a separate form.
5. Separate transmittal form will be used for submittals under separate sections of the specifications.
6. A check shall be placed in the "Variation" column when a submittal is not in accordance with the plans and specifications--also, a written statement to that effect shall be included in the space provided for "Remarks".
7. Form is self-transmittal, letter of transmittal is not required.
8. When a sample of material or Manufacturer's Certificate of Compliance is transmitted, indicate "Sample" or "Certificate" in column c, Section I.
9. U.S. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided in Section I, column i to each item submitted. In addition they will ensure enclosures are indicated and attached to the form prior to return to the contractor. The Contractor will assign action codes as indicated below in Section I, column g, to each item submitted.

### THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

A	--	Approved as submitted.	E	--	Disapproved (See attached).
B	--	Approved, except as noted on drawings.	F	--	Receipt acknowledged.
C	--	Approved, except as noted on drawings. Refer to attached sheet resubmission required.	FX	--	Receipt acknowledged, does not comply as noted with contract requirements.
D	--	Will be returned by separate correspondence.	G	--	Other ( <i>Specify</i> )

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.

(Reverse of ENG Form 4025-R)

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SECTION 01332

SUBMITTALS DURING DESIGN

**9/01**

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SECTION 01332

SUBMITTALS DURING DESIGN

**9/01**

PART 1 GENERAL

Attachments: Attachment A, Design Certification and Transmittal Letter  
DD Form 1354 - Transfer and Acceptance of Military Real  
Property  
Draft Army Pamphlet 405-45, Real Property Inventory  
Management, Table B-16 "Preparation of DD Form 1354"

1.1 SUMMARY

1.1.1 Section Includes

This section includes general requirements for developing and submitting a design including preparation of drawings, specifications and design analyses conforming to the requirements contained in this section. See Section 01336 60 PERCENT DESIGN REQUIREMENTS and Section 01338 100 PERCENT DESIGN REQUIREMENTS for specific requirements.

1.1.2 Section Excludes

This section does not include requirements for construction submittals which are specified in Section 01330, "Submittal Procedures."

1.2 REFERENCES

The references listed below form a part of this specification to the extent referenced.

1.2.1 THE CONSTRUCTION SPECIFICATIONS INSTITUTE (CSI)

CSI Masterformat                      Master List of Section Titles and Numbers

1.2.2 OMAHA DISTRICT CADD STANDARDS MANUAL

(a) Omaha District CADD Standards are available at the following internet address:

ftp://ftp.nwo.usace.army.mil/pub/ED/CADD/ae/standards/

file: ACADstd.pdf for AutoCAD.

(b) Corps of Engineers Civil Standards.

ftp://ftp.nwo.usace.army.mil/pub/ED/CADD/ae/DesBld/

file: civilstd.pdf

1.2.3 WEB SITES

In addition to the web sites listed in this section, Technical Requirement Sections 01001 SUMMARY OF WORK thru 01008 FIRE PROTECTION list web sites

where design criteria references used in this solicitation package may be found.

NOTE: FOR ITEMS (a), (b), AND (c) BELOW, REFERENCES TO RECEIVING APPROVAL FROM OTHER GOVERNMENT AGENCIES FOR ALTERNATIVE DESIGNS ARE NOT APPLICABLE TO THIS PROJECT. THE CONTRACTOR IS THE DESIGNER WHEN READING THESE DOCUMENTS.

ALL ITEMS LISTED BELOW ARE CONSIDERED TO BE A PART OF THE RFP SOLICITATION DOCUMENT (AS APPLICABLE) AND THE RESULTANT CONTRACT.

(a) TECHNICAL MANUALS (TM), TECHNICAL INSTRUCTIONS (TI), AIR FORCE MANUALS (AFM), ENGINEERING TECHNICAL LETTERS (ETL), ARMY ARCHITECTURAL AND ENGINEERING DESIGN CRITERIA (AEI), SUSTAINABLE DESIGN DOCUMENTS, AND MILITARY HANDBOOKS (MIL HNDBK) can be obtained from the National Institute of Building Sciences Construction Criteria Base (CCB) on CD-ROM. Contact the CCB directly at (202) 289-7800 for an order form or obtain an order form at the following internet address:  
<http://www.ccb.org/ccbsubscribe/Subsmain.asp>. There is a regular annual subscription fee to CCB of \$700 per year. The CCB is available on CD-ROM or DVD. Selected references are also available for downloading in Acrobat .pdf file format at the following internet address:

<http://www.hnd.usace.army.mil/techinfo>.

Additional web sites are as follows:

(1) TECHNICAL MANUALS, ETL's, ETC.:

[www.usace.army.mil/inet/usace-docs](http://www.usace.army.mil/inet/usace-docs)

Click on "Information", then the desired publication.

(2) AIR FORCE DESIGN CRITERIA:

<http://afpubs.hq.af.mil>

<http://www.asc.wpafb.af.mil/cpdc/pubs/AF/index.html>

(3) UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

This includes UFGS sections referenced, but not provided in the solicitation and other UFGS sections required in developing the project specifications. Unless noted otherwise these Guide sections are located on the CD-ROM issued with solicitation (Specsintact files under a directory labeled "Guides" An Index of available UFGS sections is included in Attachment No. 3 of this RFP.

Specsintact software is available on the CCB referred to paragraph (a) above or may be downloaded at the following internet address:

<http://si.ksc.nasa.gov/specsintact/software/software.htm>

SI Version 3.0 (Version SI3.1.382) or later shall be used. The new unified submittal format shall be selected for file format. A copy of the software (SI Version 3.0) has been included on the CD-ROM issued with this solicitation. See folder: "Software", file "si3.exe"..



### 1.3 METRIC REQUIREMENTS

(a) Wherever possible, this project shall be accomplished using "hard" metric measurements; drawings, narratives, calculations, dimensions, capacities, and similar expressions of measurement shall be expressed in "hard" metric units.

(b) Products and building components furnished in "hard" metric units are manufactured using SI units of measure.

(c) Soft metric conversions from their English units are permitted for modular construction products, unless the application of the product requires it to dimensionally coordinate into the 100 millimeter building module. Modular construction products are brick, concrete block, wallboard, plywood, suspended ceiling systems, recessed lighting, raised access flooring and other manufactured components with dimensions based upon a four (4) inch building module. Coordinate finishes available in metric with those available in non-metric. BUILDING SHALL BE CONSTRUCTED TO THE 100 MM BUILDING MODULE.

(d) Drawings shall be stated in SI units of measure (metric). Where permitted by technical or submittal requirements of this solicitation, the Contractor may provide a table of metric and english unit equivalencies. Specifications shall be stated in SI units of measure (metric) only, unless the UFGS or designated CEGS guide specifications provide only a metric unit followed by the English equivalency in parantheses or where requirements for equipment are only available in English units. See Section 01415 METRIC MEASUREMENTS for additional information.

(e) The designer shall obtain a copy of and follow the requirements in the "Metric Design Guide (PBS-PQ260), September 1995, U.S. General Services Administration Public Buildings Service. A copy is provided in Attachment No. 3 of this RFP.

### 1.4 DEFINITIONS

#### 1.4.1 Contractor

Firm or company to whom award was made to design and construct the Control Tower, located at United States Air Force Academy, Colorado.

#### 1.4.2 Design

Documents or deliverables, as defined in this section, prepared by or under the direct supervision of registered professional architects and engineers and proposed by the Contractor to meet the requirements of this solicitation.

#### 1.4.3 Design Drawings

Documentation showing in graphic and quantitative form the extent, design, location, relationships, and dimensions of the construction to be provided by the Contractor. (Note: Shop Drawings, as defined in Section 01330, "Submittals Procedures" are not to be provided until after design drawings are determined satisfactory for construction.)

#### 1.4.4 Designer

Architects and Engineers (A-E) associated with the Contractor who are

responsible for (1) preparing the design documents, (2) checking construction submittals, considered extensions of design (A-E), for compliance with the prepared Construction set design documents and (3) have the qualifications and experience specified herein.

#### 1.4.5 Request for Proposal (RFP)

Documents furnished to prospective offerors containing proposal information and specifying criteria and project requirements for design and construction of a Control Tower located at United States Air Force Academy, Colorado. The documents include this specification, attachments, and the RFP drawings.

### 1.5 QUALITY ASSURANCE

#### 1.5.1 Construction Personnel Experience

The Construction Personnel experience shall be as submitted per the requirements of Section 00110 SUBMISSION REQUIREMENTS AND INSTRUCTIONS. If, because of reasons beyond the control of the construction firm, the named individuals are not able to fulfill this obligation, replacement personnel with similar skills and experience shall be presented for acceptance by the Contracting Officer. The Contractor shall obtain the Contracting Officer's written consent before making any substitution for these designated personnel.

#### 1.5.2 Designer Qualifications and Experience

The designer qualifications and experience shall be as submitted per the requirements of Section 00110 SUBMISSION REQUIREMENTS AND INSTRUCTIONS. If, because of reasons beyond the control of the design team, the named individuals are not able to fulfill this obligation, replacement personnel with similar education and experience shall be presented for acceptance by the Contracting Officer. The Contractor shall obtain the Contracting Officer's written consent before making any substitution for these designated personnel.

### 1.6 SUBMISSION OF DESIGN DRAWINGS, SPECIFICATIONS AND DESIGN ANALYSES

#### 1.6.1 Design Certification

Within each design submittal, the Contractor shall certify that all items submitted in the design documents (after construction award) comply with Division 1 specifications and mandatory requirements of the UFGS and designated CEGS. The criteria specified in this RFP are binding contract criteria and in case of any conflict, after award, between the RFP criteria and Contractor's submittals, the RFP criteria will govern unless there is a written and signed agreement between the Contracting Officer and the Contractor waiving a specific requirement. The Contractor shall present with the letter of transmittal for each design submittal (including the 100% corrected design (backcheck) submittal) a certification that the submittal (plans, specifications, design analysis, etc.) complies with the requirements stated above, similar to that shown at Attachment A of this section.

#### 1.6.2 Deviations

Deviations from the RFP technical requirements shall be identified in the

letter of transmittal. Deviations from the RFP technical requirements will be considered and accepted by the Contracting Officer, if the changes results in a significant improvement to the project or it exceeds the minimum RFP technical requirements.

#### 1.6.3 Field Inspection

The Contractor shall verify field conditions which are significant to design, by field inspection, researching and obtaining all necessary existing facility as-built drawings and reproducing them for his own use as necessary, and discussing status with knowledgeable personnel. The information shall be reflected in the design documents.

#### 1.6.4 Drawings

##### 1.6.4.1 Software Requirements

All design drawings shall be done by the Contractor using AutoCAD 2000.dwg file format. Format shall conform to the Omaha District CADD Standards and the Omaha District CADD Design File and Sheet Naming Conventions. See Omaha District CADD Standards website listed above.

##### 1.6.4.2 RFP Drawings

The drawings furnished with this solicitation will be furnished to the Contractor in AutoCAD 2000.dwg file format within 30 calendar days of contract award.

#### 1.6.5 Design Documents

Design documents, as required by the 60 percent and 100 percent design submittals stated hereafter, shall include construction drawings, specifications and design analysis for categories such as, but not limited to, architectural, interior design, structural, mechanical, electrical, grading, drainage, paving, and outside utility services. Specifications shall be in sufficient detail to fully describe and demonstrate the quality of materials, the installation and performance of equipment, and the quality of workmanship. Detailing and installation of all equipment and materials shall comply with the manufacturer's recommendations. The design analysis shall be for each discipline of work and shall include all features with the necessary calculations, tables, methods and sources used in determining equipment and material sizes and capacities, and shall provide sufficient information to support the design.

#### 1.6.6 Design Reviews

A minimum of two design reviews during design will be held at United States Air Force Academy at the 60 percent and the 100 percent completion stages of the final design. A backcheck review will be made on the Corrected 100 percent design. Once that the Corrected 100 percent design is reviewed and determined to be satisfactory for the purpose of beginning construction, the Contractor shall prepare and distribute sets of documents for construction. The Contractor shall attend the design reviews, visit the site and make other trips as necessary during the design to accomplish the

work.

#### 1.6.7 Document Packaging

The 60 percent design submittal includes the 60 percent complete site and utility design and building design. These documents shall be packaged and stamped "For Review Only - 60% Design"; and each sheet of the drawings shall also be stamped. The 100 percent design submittal includes 100 percent complete site and utility design and building design and shall be stamped "For Review Only -100% Design", and each sheet of the drawings shall also be stamped. The backcheck design submittal(s) after the Government review of the 100 percent complete site and utility design and building design shall be stamped "100% Corrected Design"; and each sheet of the drawings shall also be stamped. The 100% Corrected Design submittal is for making corrections resulting from review comments and for preparing the final project documents. No additional time for completion of the contract will be granted to the Contractor due to insufficient design submittals. See paragraph 3.7.6 "Government Design Review and Acceptance" for additional requirements.

#### PART 2 PRODUCTS (NOT APPLICABLE)

#### PART 3 EXECUTION

##### 3.1 DRAWINGS

Prepare, organize, and present drawings in the format specified herein. Provide drawings complete, accurate and explicit enough to show compliance with the RFP requirements and to permit construction. Drawings illustrating systems proposed to meet the requirements of the RFP performance specifications shall reflect proper detailing for each such system to assure appropriate use, proper fit, compatibility of components and coordination with the design analysis and specifications required by this section. Coordinate drawings to ensure there are no conflicts between design disciplines and between drawings and specifications. For specific drawing requirements, see Sections 01336 60 PERCENT DESIGN REQUIREMENTS and 01338 100 PERCENT DESIGN REQUIREMENTS. The following subparagraphs cover general drawing requirements.

##### 3.1.1 Drawings Format

Full size drawings are considered 594 mm x 841 mm. Half-size drawings are considered 420 mm x 297 mm. Title block shall be as indicated in the Omaha District CADD Standards Manual. Recommended drawing scales are specified in Sections 01336 60 PERCENT DESIGN REQUIREMENTS and 01338 100 PERCENT DESIGN REQUIREMENTS. The Cover Sheet of the Contractor prepared drawings shall bear the stamp or seal and signature of the registered architect or appropriate engineer responsible for the work and proposed to meet the RFP requirements. Drawing code numbers for the design and construction drawings shall be as follows:

AF 133-10-01

##### 3.1.2 Drawings Sequence

Arrange drawings by design discipline in accordance with Omaha District CADD Standards Manual.

### 3.1.3 Drawings Required

As a minimum, the Contractor shall prepare and submit the following design drawings:

- a. Title Sheet, Index of Drawings, Legend and Abbreviations and Soil Borings.
- b. Civil Drawings
- c. Utility Drawings (Water Supply, Wastewater, Gas, and Electrical)
- d. Architectural Drawings
- e. Interior Design Drawings
- f. Structural Drawings
- g. Mechanical Drawings
- h. Plumbing drawings
- i. Electrical Drawings
- j. Fire Protection Drawings

### 3.2 SPECIFICATIONS

The Contractor shall develop project specifications utilizing the Division 1 Specifications furnished with this RFP; unedited Unified Facilities Guide Specifications (UFGS); designated specification sections furnished with this RFP; and the development of additional project specifications not covered by UFGS. Guide specifications are located on the CD-ROM issued with this solicitation.

The Contractor shall utilize Specsintact software.

Minimum and recommended hardware requirements are as follows:

MINIMUM REQUIREMENTS	RECOMMENDED REQUIREMENTS
486 (Windows 95/98/NT/2000)	Pentium Class Processor
8MB RAM (Windows 95)	32MB RAM
16MB RAM (Windows 98/NT/2000)	
24MB (local) 56MB (Network)	50 MB (local) 75 MB (Network)
Free Hard Drive Space	Free Hard Drive Space
SVGA Monitor	SVGA Monitor with 800 x 600 resolution
3 1/2 inch 1.44 MB floppy drive	3 1/2 inch 1.44 MB floppy drive
CD ROM Drive	CD ROM Drive
Laser Printer	Laser Printer

Note: Additional Hard Drive space is required for storing project specifications and masters.

a. Technical Specifications

The Contractor shall be required to use unedited UFGS and designated unedited CEGS sections for developing project specifications. Specification paragraphs and subparagraphs shall not be rewritten to lessen the quality of the original technical specification sections. The technical guide specifications describe the type and quality of material and installation normally acceptable for Corps of Engineers Construction, and often represent specific agreement between the Corps and the applicable industry. The provision of the technical guide specification should not be changed without justification. Justifications and identification for additional materials shall be identified in the design analysis under the appropriate design discipline. Designer notes shall not appear in any design submittals. Only bracketed choices and inapplicable items shall be marked for deletion. These items shall be removed in corrected 100 percent specifications submittal. The Contractor shall complete the editing of all options in these specifications. Where designer notes are provided, the Contractor shall edit the choice in accordance with the recommendations and guidance of the Notes, except where specific guidance has been provided with this RFP (i.e. submittal paragraph). See additional requirements in Sections 01336 60 PERCENT DESIGN REQUIREMENTS and 01338 100 PERCENT DESIGN REQUIREMENTS.

b. Editing Technical Specifications (Designated CEGS or UFGS)

(1) ADDITIONS: If the specifications of the UFGS or designated CEGS does not cover a feature that is in the project, new sentences and/or paragraphs shall be inserted in the proper locations to adequately cover the feature of work. Additions shall not lessen the quality of materials indicated by the specifications. If a new material is added, it shall be properly referenced in "Applicable Publications," "MATERIALS," "SUBMITTAL," "TESTS," and "INSTALLATION" paragraphs, as applicable.

(2) DELETION OF INAPPLICABLE TEXT MATERIAL, AS NECESSARY, TO TAILOR THE SPECIFICATIONS TO FIT THE PROJECT: After deletion has been made to all inapplicable paragraphs, subparagraphs, choices, and schedules from the body of the specifications (including but not limited to the correction of lists in "Submittals," "Tests," and "Installation" paragraphs), delete all nonapplicable references listed in the preceding "APPLICABLE PUBLICATIONS" and "MATERIALS" paragraphs. Deletions shall not lessen the quality of materials indicated by the specifications.

(3) Do not remove any special code markings for submittals, references, tests or section references, unless the text is not required.

(4) REFERENCES TO SPECIFICATION SECTIONS. The Contractor shall be responsible for coordinating references, along with the technical requirements, to specific specification sections (number and title) within the project specifications. Section references (title and number) shall be revised to reflect the titles and numbers of specification sections used.

(5) SUBMITTALS. Each section of the specifications includes a

submittal paragraph which lists all applicable Contractor submittals: (a) for review and approval by the Contractor's designer and, (b) for "For Approval" or "For Information Only" by Construction field offices. Submittals shall be properly marked as outlined in the Specsintact documentation and in this section. These codings are used for automatic generation of the Submittal Register in the Specsintact Software. These codings must NOT be deleted from the text, unless the submittal is not required. The Submittal Item text between the coding shall be identical (word for word, including punctuation and spacing) to the paragraph text in the reference paragraph(s). Text may be either upper or lower case letters. An example of an submittal paragraph is listed below with text telling what each item stands for directly below each listing.

"1.\_ SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fire Sprinkler Design Drawings; G-AE

SD-03 Product Data

Meters; G-RE

Regulators

SD-08 Manufacturer's Instructions

Dielectric Unions

Pressure Reducing Valves

See Section 01330: SUBMITTAL PROCEDURES for the list of Submittal Descriptions and Numbers and for submittal classification and further explanation of the submittal process.

Submittal Classifications (G-AE, G-RE, and FIO) are as follows:

G-AE - G-AE submittals are limited to those that address design work to be performed by the Construction Contractor, items that are considered extremely critical to the designer, or items that involve life safety issues. These submittals are considered to be an extension of design and must be approved by the Contractor's designer of the responsible design organization. Some examples of G-AE submittal extensions of design would include contract documents which do not show complete details of design, contract documents with performance type requirements, critical materials that would be difficult to access for corrections or when the Contractor intends to deviate or vary from the design. The Government will review all G-AE approved submittals for conformance to the Solicitation. The Government will review all submittals designated as deviating from the Solicitation or completed design.

G-RE - G-RE submittals are those that need to be reviewed for conformance to the contract by the Area or Resident Office (as directed). Some examples of G-RE submittals would include variations from the Solicitation package or 100% Corrected Design and other items as designated by the Contracting Officer's Representative. Submittals shall be reviewed and approved by the Contractor's Quality Control Representative and Designer (if applicable), prior to submittal to the Government.

FIO - For Information Only. FIO submittals are those submittals that demonstrate to the Contractor that subcontractors and suppliers are providing materials, equipment, and installation conforms to the contract requirements. FIO submittals also provide information that the Contractor's Quality Control representative needs to verify that the quality specified in the contract is being incorporated into construction of the project. These submittals shall be approved by the Contractor's Quality Control Representative and/or Designer, prior to submittal to the Contracting Officer's Representative. Some examples of FIO submittals would include reports, records, data, instructions and catalog cuts. NOTE: "FIO" IS ANY SUBMITTAL ITEM THAT DOES NOT HAVE A "G-AE" OR "G-RE" CLASSIFICATION. SEE PARAGRAPH BELOW ON HOW TO CORRECTLY IDENTIFY A FIO SUBMITTAL.

For each submittal requirement in the Guide specification, designers shall indicate a submittal type (G-AE, G-RE, or FIO) or shall delete the requirement for the submittal. For submittals that are preselected in the Guide Specification as G or GA, the designer must evaluate the submittal to determine if it is an extension of design. If so, the designer shall change the G to G-AE. Designers shall delete all Certificates (Submittal Designation (SD-07)) except those preselected in the Guide Specifications or required by regulation, code, or law. The designer shall designate these as FIO. To designate a submittal item as FIO, mark the semi-colon following the submittal item and also the submittal tags up to the Item tag for deletion (i.e. "; [ ], [ ]") Designers shall designate all Instructions (SD-08), Test Reports (SD-09 or SD-06), and Closeout Submittals (SD-11) as FIO. Designers shall identify submittal classifications for all required submittals.

#### (6) USE OF UFGS SECTIONS

UFGS sections are joint effort of the U.S. Army Corps of Engineers (USACE), the Naval Facilities Engineering Command (NAVFAC) and the Airforce Civil Engineer Support Agency (AFCEA). Unless directed to otherwise, use UFGS sections. Available UFGS sections include sections that have a 5 digit section number with either the letters "A" or "N" following the section number or no letter following the section number.

The letters designate the specification proponent ("A" is for USACE and "N" is for NAVFAC). The Contractor shall use sections with the letter "A" following the section number or sections with no letter following the section number. Sections with the letter "N" following the section number shall not be used unless there is no other available section, the solicitation directs the use of these sections or the available sections do not meet the solicitation requirements. Do not use Division 1 Sections that have the letter "N" following the section number. Where UFGS sections include tailoring options for both Army and Navy, use the Army tailoring option. Where conflicts exist that cannot be resolved, the Contracting Officer shall be contacted to resolve the issue.



c. Developing Additional Project Specifications.

If the need should arise for developing project specifications on materials/items not covered in by the UFGS or designated CEGS, the Contractor shall develop specifications utilizing commercial Construction Specifications Institute (CSI), 16 Division, 3 Part Section Format. These specifications shall conform to the applicable criteria requirements indicated in the solicitation (Sections 01001 thru 01008). For these specification sections, write at the Mediumscope level of detail as described in CSI Masterformat. Use Mediumscope level section numbers and titles as identified in CSI Masterformat. Adjust section numbers which conflict with the specifications used in the Project Specifications. Each of these developed specification sections shall be in the same format as the CSI format specifications included in the UFGS (including the submittal paragraph). Commercially available guide specifications such as "SpecText" published by The Construction Specifications Institute and "MasterSpec" published by The American Institute of Architects or Unified Facilities Guide Specifications (UFGS) may be used, subject to the format, coding and submittal paragraph requirements. References to the "Architect/Engineer" and the "Owner" shall be changed to refer to the "Government" or "Contracting Officer," as appropriate. The specifications shall clearly identify, where appropriate, the specific products chosen to meet the requirements of the specifications (manufacturers' brand names and model numbers or similar product information). The Contractor shall be responsible for coordinating references, along with the technical requirements, to specific specification sections (number and title) within the project specifications. Section references (title and number) shall be revised to reflect the titles and numbers of specification sections used.

d. Division 1 Sections

Include Division 1 specifications sections (01040 AS-BUILT DRAWINGS, 01200 WARRANTY OF CONSTRUCTION, 01320A PROJECT SCHEDULE, 01330 SUBMITTAL PROCEDURES, 01355 ENVIRONMENT PROTECTION, and 01451A CONTRACTOR QUALITY CONTROL contained in the RFP as part of the project specifications without change. Copies of these sections and other Division 1 specifications included with the RFP will be furnished (upon request) to the successful offeror in Specsintact. No other Division 1 Specifications will be required, unless specified otherwise in this solicitation or required by the Contractor.

3.2.1 Format for Project Specifications

Submit the project specification, including a Cover page and Table of Contents, printed with a word processor (Using Specintact software) using good quality white paper. For the 60 percent and 100 percent design submittals, editing of the CEGS and UFGS shall be shown as indicated in the Specsintact documentation for text deletions and for text insertions. The corrected 100 percent specifications with review comments incorporated shall be cleaned up (markings for insertion and deletion removed) and submitted in both hard copy and on magnetic media (A Microsoft Windows compatible CD-ROM and compatible with the "Specsintact" micro computer software package.). The Cover page and attachments to specification sections shall be prepared in a Microsoft Word (compatible with Microsoft Word 97) format. Carbon copies are not acceptable.

Format shall be as outlined in the Specsintact documentation.

Each specification section shall include a Section Table of Contents which

is combined with the page numbering of the specification section.

The Cover page shall be similar to the RFP Cover page and shall include:

- a. Project title, Project Number, activity and location
- b. Construction contract number
- c. Construction Contractor's name and address
- d. Design firm's name and address
- e. Names of design team members (Designers of record) responsible for each Contractor prepared technical discipline of the project specification
- f. Name and signature of a Principal of the design firm

The Table of Contents shall list the 16 Divisions contained in CSI format and the specification section numbers and titles contained in the project specification.

### 3.2.2 Reports

The Contractor shall submit the following Specsintact reports with the 100 percent and Corrected 100 percent design submittals: Address Verification, Reference Verification, Section Verification, Bracket Verification, Submittal Verification, Submittal Register and any other reports requested by the Contracting Officer. References shall be reconciled when printing reports. The reports to be submitted for review shall be after the Contractor has corrected the errors generated by these reports. From the errors generated by the reference verification reports, fix only those errors where there is a discrepancy with the issue date of a publication (i.e., NFPA 70, revise to the latest code requirement). Address, Reference and Submittal Reconciliation shall be completed prior to submittal of the 100 percent design.

### 3.2.3 Construction Submittals

All construction submittals shall be in accordance with Section 01330, "SUBMITTAL PROCEDURES".

Construction submittal types and products, including the submittal description numbers and data package numbers, shall be included in the specification sections, where required. When appropriate, use specific product terms instead of the generic product terms contained in the specifications sections (e.g., asphalt shingles, built-up roofing, EPDM single ply, etc. vs roof covering; concrete masonry units, brick, metal siding, etc. vs exterior skin; mineral fiber board, block, batt or blanket, polystyrene, polyurethane, polyisocyanurate board vs insulation).

#### 3.2.3.1 Submittals Register (Form)

Prepare and maintain a Submittals Register. The Submittal Register (ENG Form 4288 "Submittal Register" shall be prepared using Specsintact Software. Additional instructions for completing the form are contained in Section 01330, "Submittal Procedures."

Fill in columns "c" through "f" and submit with the 100 percent design

submittal. The Submittal Register will be returned to the Contractor along with the reviewed and accepted design.

Resubmit the Submittal Register as a construction submittal as required in Section 01330, "SUBMITTAL PROCEDURES." The Contractor shall provide an electronic copy of the accepted submittal register, generated by the Specsintact software, three (3) working days prior to the pre-construction conference. Remaining columns will be filled in at the appropriate time and by the appropriate authorities during construction.

### 3.3 DESIGN ANALYSES

Prepare design analyses (basis of design and calculations) for each design discipline. Specific requirements relative to the technical content to be provided are specified herein and in Section 01336 60 PERCENT DESIGN SUBMITTALS and Section 01338 100 PERCENT DESIGN SUBMITTALS. The design analyses shall include a basis of design and calculations for each discipline. The design analyses shall be a presentation of facts to demonstrate that the concept of the project is fully understood and that the design is based on sound engineering. The design analysis for each discipline shall include:

a. A basis of design consisting of:

(1) An introductory description of the project concept which addresses the salient points of the design;

(2) An orderly and comprehensive documentation of criteria, rationale, assumptions and reasoning for system selection.

b. Calculations required to support the design.

c. Project Engineering Considerations and Instructions (ECI) for Final Design Analysis.

The Contractor shall not make reference to the RFP solicitation to avoid stating the requirements for the basis for design.

#### 3.3.1 Format

The design analysis shall include: a cover page indicating the stage of design "PRELIMINARY DESIGN ANALYSIS": for 60 percent design submittal and "FINAL DESIGN ANALYSIS" for 100 percent design submittal, the project title "CONTROL TOWER", fiscal year and program funding "FY 02, PN:XQPZ400500", location "UNITED STATES AIR FORCE ACADEMY, COLORADO", who prepared the design analysis "Prepared By:" followed by Name of AE and Construction Contractor, location of AE and Construction Contractor Office involved with the design, and construction contract number; table of contents; and tabbed separations for each part of design analysis for quick reference. The cover sheet shall indicate the volume number and total number of volumes for the project. Provide a cover sheet for each volume. Submit design analyses prepared on 8 1/2 by 11 inch white paper. The design analysis for all disciplines shall be bound in one volume, excluding calculations. Multiple volumes for individual disciplines, appropriately numbered, may be provided, when required. For Electronic media requirements, see the NOTES for the Construction Set Distribution (paragraph 3.7.1.6). Narratives shall be provided in decimal paragraph numbering system (i.e. 1, 1.1, 1.1.1, 1.1.1.1 etc.). Narratives shall be an original document that does not copy the text from the RFP document sections, unless directed otherwise

and shall be written in the same tense (Past or Present) for the entire design analysis. Organize design analysis narrative into the following parts, as follows:

3.3.1.1 Part 1 - General Description.

This part will provide statements of purpose, authority and applicable criteria. A description of the project and a summary of the economic factors influencing the choice of the civil, architectural, structural, mechanical, electrical, fire safety, water supply and wastewater disposal systems used in the project shall be provided along with an indication of how initial and life costs were considered.

**a. Purpose.** Include the following statement under the heading of "PURPOSE":

"The new Control Tower located at the USAF Academy is being designed and constructed to allow for adequate comprehensive programs for both cadet students and air traffic control personnel. The Control Tower will control the glider and powered aircraft used in cadet training. The anticipated average daily attendance for this facility is approximately 80 people, 50 cadet students, 10 air traffic controllers, 6 student air traffic controllers, and VIP tours."

**b. Authority.** Provide the following authorization statement under the heading "AUTHORITY" for the project: "The preparation of design documents was authorized by Design Directive # \_\_\_\_\_. (Contact Project Manager: Jay Hodges at (402) 221-3986 for Design Directive #, dates and authorization statement.

**c. Applicable Criteria.** Provide a list of the general criteria that pertains to all disciplines used in the design. Specific criteria used in a particular engineering/architectural discipline shall be listed in the text of the appropriate discipline in Part 2 of the design analysis. Such criteria shall be referenced accordingly.

**d. Project Description.** Provide a description of the project and summary of economic factors influencing the choice of materials and systems used in the project.

3.3.1.2 Part 2 - Design Requirements and Provisions.

This part of the design analysis shall provide statements of factors considered and provided in the design along with supporting justification of design decisions and design calculations. Include narratives for each of the following areas or disciplines. See Sections 01336 60 PERCENT DESIGN REQUIREMENTS and 01338 100 PERCENT DESIGN REQUIREMENTS for specific requirements.

- a. Civil
- b. Water Supply and Wastewater
- c. Architectural
- d. Interior Design
- e. Structural

- f. Mechanical
- g. Electrical
- h. Fire Protection
- i. Environmental Protection, Compliance and Permits
- j. Health and Safety
- k. Sustainable Design

### 3.3.2 Calculations

All calculations shall be placed in separate appendix volume(s). Calculations shall include a cover page similar to the design analysis narrative cover page, a table of contents, index page and a summary of criteria for each appendix on the first pages and the project title, and location identified on every page of the calculations. All calculation pages shall be clearly legible and photo-ready. Each discipline which requires calculations shall be consecutively numbered (Example: A-1, A-2, A-3 etc. for Water Supply and Wastewater Calculations and B-1, B-2, B-3, etc. for Structural Calculations) and the date. Cite criteria from which the calculations, rationale, and formulae are extracted by publication number, title, edition and page number. The cover page and each page of calculations shall also include the names of the persons originating and checking the calculations. The person checking the calculations shall be a registered professional engineer other than the originator. In addition, the signature and seal of the appropriate registered professional engineer responsible for the work shall appear on the cover page of the calculations for each discipline. Each appendix index page shall list subtopics (e.g. for Structural - Loads, Materials, References, Wind Analysis, Footing Design, Wall Design, Column Design, etc.) with pages numbers where each of these subtopics can be found in the calculations.

Computer printouts shall be consecutively page numbered and identified similar to the calculations. Identify the computer program name, source, and version. All schematic models used for computer input shall be provided.

### 3.3.3 Engineering Considerations and Instructions (ECI) for Field Personnel

#### 3.3.3.1 Separate Appendix

Under a separate appendix in the Final Design Analysis, the Design-Build Contractor shall include the following items:

- a. Features critical to the quality of the final construction product requiring special attention.
- b. Submittals requiring special attention during construction.
- c. Special user requirements or instructions.
- d. Assumed field conditions, pertinent significant aspects, or critical phases of the project used as a basis of project design.

#### 3.3.3.2 Format

Format for ECI's shall include the following information:

**"ENGINEERING CONSIDERATIONS AND INSTRUCTIONS**

Project Name: \_\_\_\_\_

Location: \_\_\_\_\_

Designer Name: \_\_\_\_\_ Phone: \_\_\_\_\_

Discipline: \_\_\_\_\_

Design-Build designers have prepared the following engineering considerations and instructions (ECI). These ECI's should be followed during the construction of the above project. If you have any questions, contact the appropriate Design-Build designer."

3.3.3.3 Distribution of ECI's

In addition to including ECI's in a separate appendix of the final design analysis and after acceptance of the 100 percent corrected design and prior to the start of construction, the design-build Contractor shall e-mail a copy of the ECI's to the appropriate U.S. Army Corps of Engineer's Field representative for his consideration with a copy also sent to the appropriate individual in following office(s): CENWO-CD-QR and CENWO-PM-M.

The Government will provide the names and e-mail addresses to the design-build Contractor at either the pre-design or pre-construction conference.

3.3.4 Requests for Information, Meeting Minutes and Comments

Copies of Requests for Information (RFI) made by the Contractor to the Government shall be included as an appendix to the design analysis. An index of each RFI, which documents the RFI number, the date RFI given to Government, the date the RFI is answered and the Action Response provided by the Government.

A copy of all meeting minutes and design review comments (if any) with action responses shall be included as an appendix to the design analysis.

Appendices for RFI's and Meeting Minutes and design review comments shall have page numbering that follows the same format as for Calculations listed above.

3.4 DESIGN CERTIFICATION

The Contractor shall provide certification signed by an officer of the Contractor's company attesting that the drawings, specifications and design analyses prepared for the construction of the facility meet the requirements of the RFP. The certification shall accompany the submission of the design documents along with names and disciplines for the designers of record. This design certification shall include a list of deviations (variations) from the solicitation or accepted final design. Prepare the design certification and transmittal letter in the format shown on Attachment A included at the end of this section.

3.5 60 PERCENT DESIGN SUBMITTALS

See Section 01336 60 PERCENT DESIGN REQUIREMENTS.

### 3.6 100 PERCENT DESIGN SUBMITTALS

See Section 01338 100 PERCENT DESIGN REQUIREMENTS.

### 3.7 REVIEW BY GOVERNMENT AGENCIES

#### 3.7.1 Distribution of Design Documents for Conformance Review

(a) Government agencies shall receive review documents thirty (30) days prior to review conferences. The documents will be in their then-present "on-board" design status (except for the 100% design submittal). Agencies reviewing documents, and in the quantities indicated, are listed below. All documents must contain an index of contents. Work shall continue during the review period between the 60% design submission and the 60% design review conference. Work shall be 100% complete when the 100% design is submitted. Design work shall not continue during the review period between the 100% design submission and the 100% design review conference. All submittals shall be transmitted by **express mail**. Originals of transmittal letters should be sent to the Omaha District and copies should accompany each mail package. Transmittal letters shall indicate distribution by use of the "ATTN" code shown in the address. Design document set shall include the items listed below. Some of the Construction submittals are also listed. Design submittals shall be submitted as a complete package. The distribution listed below also applies to all design reviews and design package accepted for construction.

(b) If the Government requires more time than the thirty (30) days given, prior to either of the review conferences, the Contractor will be granted an extension of time equal to the number of calendar days of delay.

#### 3.7.1.1 Submittal Items

The submittal items listed below are intended to identify the different design submittals required throughout the design process and select submittals required during and at the completion of Construction. Each submittal item has an Abbreviation, which will be used in conjunction with the number of required copies. See paragraphs 3.7.1.3 through 3.7.1.7 for required copies for distribution.

#### SUBMITTAL ITEM - **ABBREVIATION**

Design Analysis Narrative - **DANar**

Design Analysis Calculations - **DACalcs**

Specifications - **Specs**

Specification Error Reports - **SpecER**

Submittal Register - **SubReg**

Drawings (1/2 size) - **Dwg-1/2**

Drawings (Full size) - **Dwg-full**

Meeting Minutes with Annotated Comments and Other Attachments - **MMin**

As-Built Drawings - **Asblt**

Electronic Media Drawings - **EMDwg**

Electronic Media Specifications - **EMSpecs**

Electronic Media Design Analysis - **EMDA**

Design Certification Letter - **DCLet**

Color Board - **ColBd**

DD Form 1354 - Transfer and Acceptance of Military Real Property - **DD1354**

Environmental Protection Plan - **EP Plan**

Engineering Considerations and Instructions - **ECI**

Renderings - **Rend**  
Comprehensive Interior Design - **CID**

### 3.7.1.2 Activity Distribution Addresses

Engineering Division  
Attn: CENWO-PM-M (Jay Hodges)  
U.S Army Engineer District, Omaha  
106 South 15th Street  
Omaha, NE 68102-1618

Construction Division  
Attn: CENWO-CD-Q  
U.S. Army Engineer District, Omaha  
106 South 15th Street  
Omaha, NE 68102-1618

Rocky Mountain Area Engineer  
Attn: CENWO-CD-RM  
U.S. Army Corps of Engineers  
1050 South Academy Boulevard, Suite 100  
Colorado Springs, Co 80914-2370

10th Civil Engineering Group  
ATTN: 510CEG/CECX, Ralph Clark  
8120 Edgerton Drive, Suite 40  
United States Air Force Academy, CO 80840-2400

### 3.7.1.3 60 Percent Design Distribution

See paragraphs above explaining Submittal Abbreviation Codes and Activity Distribution Addresses. The number of copies required for each submittal item are listed below.

Activity   CENWO-PM-M   CENWO-CD-Q   CENWO-CD-RM   10 CEG/CECX

Submittal  
Item

DANar-	8	2	4	8
DACalcs-	6	2	2	4
Specs-*(1)	8	2	4	8
Dwg-1/2-	8	2	4	8
MMin-*(2)	8	2	4	8
EMDwg-	1*(3)	-	-	-
DCLet-	8	2	4	8
ColBd-	1	-	1	2
EP Plan	1	-	1	1
CID-	2	-	-	-

#### \*60 PERCENT SUBMITTAL NOTES:

Specific submittal requirements are identified in Sections 01332 and 01336

\*(1) Copy shall show deletions and insertions (Revisions On) for all UFGS and designated CEGS specifications submitted. Process and Print Options for each section furnished shall include the following minimum requirements: Under "Sections" Print/Process Sections and Renumber Paragraphs boxes are checked; Under "Reports" a Section Table of Contents



(Include Without Scope and Combine sections and section tables of contents); Under "Options" Section Dates shown, Units of Measure as metric, Tags are Hidden, Notes are hidden, Revisions are shown, Start Page Numbering with "1", and Restart for each section box is checked; and Under "Header/Footer" jobtitle and jobname as a Header and Section number and Page number as a footer (similar to format shown on this section of the RFP).

\*(2) To be submitted after Review Conference per requirements of this section.

\*(3) Electronic Media Drawings:

Fifteen (15) percent of all drawings, representative of all design disciplines, shall be submitted in (AutoCAD 2000) on CD-ROM to verify that the CADD standards being specified are complied with.

#### 3.7.1.4 100 Percent Design Distribution

See paragraphs above explaining Submittal Abbreviation Codes and Activity Distribution Addresses. The number of copies required for each submittal item are listed below.

Activity CENWO-PM-M CENWO-CD-Q CENWO-CD-RM 10 CEG/CECX

Submittal  
Item

DANar-	8	2	4	8
DACalcs-	6	2	2	4
Specs-*(1)	8	2	4	8
Dwg-1/2-	8	2	4	8
MMin-*(2)	8	2	4	8
EMDwg-*(3)	1	-	-	-
DCLet-	8	2	4	8
ColBd-*(4)	1	-	1	2
EP Plan	1	-	1	1
CID-	2	-	-	-

\*100 PERCENT SUBMITTAL NOTES:

Specific Submittal requirements are addressed in Section 01332 and 01338.

\*(1) Copy shall show deletions and insertions (Revisions On) for all UFGS and designated CEGS specifications submitted. Process and Print Options for each section furnished shall include the following minimum requirements: Under "Sections" Reconcile References, Print/Process Sections and Renumber Paragraphs boxes are checked; Under "Reports" a Section Table of Contents (Include Without Scope and Combine sections and section tables of contents), and Reference Verification, Submittal Verification, Reference Verification, Submittal Verification, Bracket Verification, Section Verification and Submittal Register boxes are checked; Under "Options" Section Dates shown, Units of Measure as metric, Tags are Hidden, Notes are hidden, Revisions are shown, Start Page Numbering with "1", and Restart for each section box is checked; and Under "Header/Footer" jobtitle and jobname as a Header and Section number and Page number as a footer (similar to format shown on this section of the RFP).

\*(2) To be submitted after Review Conference per requirements of this section.

\* (3) Electronic Media Drawings:

Fifteen (15) percent of all drawings, representative of all design disciplines, shall be submitted in (AutoCAD 2000) on CD-ROM to verify that the CADD standards being specified are complied with.

\* (4) Color boards shall show actual color samples of all proposed exterior and interior finishes.

3.7.1.5 100 Percent Corrected Design Distribution

See paragraphs above explaining Submittal Abbreviation Codes and Activity Distribution Addresses. The number of copies required for each submittal item are listed below.

Activity CENWO-PM-M CENWO-CD-Q CENWO-CD-RM 10 CEG/CECX

Submittal  
Item

DANar-	8	2	4	8
DACalcs-	6	2	2	4
Specs-* (1)	8	2	4	8
Dwg-1/2-	8	2	4	8
MMin-* (2)	8	2	4	8
EMDwg-* (3)	1	-	-	-
DCLet-	8	2	4	8
ColBd-* (4)	1	-	1	2
EP Plan	1	-	1	1
ECI-	8	2	4	1
CID-* (5)	2	-	-	-

\*100 PERCENT CORRECTED SUBMITTAL NOTES:

Specific Submittal requirements are addressed in Section 01332 and 01338.

\* (1) Copy shall show revisions executed (deletions removed and insertions markings removed) for all specification sections submitted. Process and Print Options for each section furnished shall include the following minimum requirements: Under "Sections" Reconcile References and Addresses, Print/Process Sections and Renumber Paragraphs boxes are checked; Under "Reports" a Section Table of Contents (Include Without Scope and Combine sections and section tables of contents), and Reference Verification, Submittal Verification, Reference Verification, Submittal Verification, Bracket Verification, Section Verification and Submittal Register boxes are checked; Under "Options" Section Dates shown, Units of Measure as metric, Tags are Hidden, Notes are hidden, Revisions are hidden, Start Page Numbering with "1", and Restart for each section box is checked; and Under "Header/Footer" jobtitle and jobname as a Header and Section number and Page number as a footer (similar to format shown on this section of the RFP).

\* (2) To be submitted after Review Conference per requirements of this section.

\* (3) Electronic Media Drawings (AutoCAD 2000) on CD-ROM shall be submitted to verify that the CADD standards being specified are complied with. Resubmittal is not required for interior design submittal, if there are no changes required to the previous submittal.

\* (4) Color Boards are not required if there are no changes from the previous design submittal and if only minor changes are required, submit

applicable coded samples (with tape ready for application) and corrected color legend. If major changes to the color board are required, resubmit the Color boards with actual color samples of all proposed exterior and interior finishes and revised corrected color legend.

\*(5) If minor changes to the CID are required, submit corrected sheets for installation into binder. If major changes to CID are required, resubmit entire CID.

### 3.7.1.6 Construction Set Distribution

See paragraphs above explaining Submittal Abbreviation Codes and Activity Distribution Addresses. The number of copies required for each submittal item are listed below.

Activity	CENWO-PM-M	CENWO-CD-Q	CENWO-CD-RM	10 CEG/CECX
<u>Submittal</u>				
<u>Item</u>				
DANar-	8	2	6	8
DACalcs-	4	2	2	4
Specs-*(1)	8	2	6	8
SpecER-	1	1	-	-
SubReg-	2	2	2	-
Dwg-1/2-	8	2	6	8
Dwg-full-	-	-	1	1*(2)
EMDwg-*(3)	4	-	-	-
EMSpecs-*(3)	4	-	-	-
EMDA-*(3)	4	-	-	-
DCLet-	8	2	2	8
ECI-	8	2*(4)	4*(4)	8
Colbd-*5	1	-	1	2

#### \*CONSTRUCTION SET SUBMITTAL NOTES:

Specific Submittal requirements are addressed in Section 01332 and 01338.

\*(1) Copy shall be the same as the 100 percent Corrected submittal and incorporate any additional comments made to 100 percent corrected design submittal.

\*(2) Each drawing sheet shall be stamped (P.E.) by the appropriate Designer.

\*(3) Electronic Media Drawings (AutoCAD 2000 ), Electronic Media Specifications (Specsintact), and Electronic Media Design Analysis (MS Word (compatible with MS Word 97) and Adobe Acrobat 5.0. The Design Analysis Calculations shall be included with the design analysis narrative and shall be scanned and saved in Adobe Acrobat 5.0. The design analysis and calculations shall utilize bookmarks for each chapter of the design analysis and each appendix or calculations. Electronic Media shall be on CD-ROM (Recordable compact disk with minimum 650 megabyte capacity)

\*(4) In addition, the Contractor shall e-mail the designated offices a copy of the ECI per requirements stated in this section.

\*(5) Reflects all changes made through accepted 100 Percent Corrected Design.

### 3.7.1.7 As-Built Submittals

See paragraphs above explaining Submittal Abbreviation Codes and Activity

Distribution Addresses. The number of copies required for each submittal item are listed below.

<u>Activity</u>	<u>CENWO-PM-M</u>	<u>CENWO-CD-Q</u>	<u>CENWO-CD-RM</u>	<u>10 CEG/CECX</u>
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<u>Submittal Item</u>				
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Asblt-	*	-	-	-
DD1354-	1	1	1	1

\*NOTES for As-Built Submittals:

\*See Section 01040, AS-BUILT DRAWINGS for requirements.

### 3.7.1.8 Design Submittal Alternative

The design-build Contractor may submit hard copy design analysis, design analysis calculations and appendices, specifications, specification error reports, submittal register, design certification letter, and engineering considerations and instructions on CD-ROM in an Adobe Acrobat 5.0 .pdf format and maximum of 2 hard copies per office per submittal listed above (CD's are substituted for hard copy numbers). If this alternative is selected, each of these documents shall utilize bookmarks with titles, which ease the review of the design. Each design submittal item and submittal item components shall be made easy to find (i.e. each specification section, chapters and appendices of design analysis, and each submittal item). This alternative will only be allowed if the design-build Contractor presents a legible and easy to review design. Failure to meet this requirement on one design submittal will result in requiring all future submittals and resubmittals to be hard copy as required above, at no additional cost to the Government.

### 3.7.2 Review Comments:

For each design review submittal, the Contractor will be furnished comments from Omaha District and other agencies involved in the review process approximately 21 days after receipt and review conference will be held approximately 30 days after receipt. If the Contractor disagrees technically with any comment or comments and does not intend to comply with the comment, he/she shall clearly outline, with justification reasons for noncompliance at the design review conference in order that the comments can be resolved. Annotated comments, including the disposition of all comments shall be furnished in writing by the Contractor within five (5) days of the review conference and shall be recorded in the Contractor prepared Meeting Minutes described in paragraph 3.7.6.1. The written documentation shall be forwarded in the same quantities to the distribution list shown in paragraph: "Distribution of Design Documents for Conformance Review" above.

### 3.7.3 Using Automated Review Management System:

Conference and post conference action: Government personnel, from the above Government Agencies, will present review comments for discussion and resolution. Copies of comments, annotated with comment action agreed on, will be made available to all parties before the conference adjourns. Unresolved problems will be resolved by immediate follow-on action at the

end of conferences. Valid comments will be incorporated. After receipt of final corrected design documents upon incorporation of all backcheck comments (as many backchecks as are deemed necessary by the Government will be conducted), the Omaha District will recommend acceptance to proceed with construction. The Government intends to utilize the Dr. Checks review system, which is available at: [www.buildersnet.org/drchecks](http://www.buildersnet.org/drchecks), for processing review comments and responses. Access rights will be provided to the Design-Build Contractor after contract award. The Government, however, reserves the right to not accept design document submittals and withhold design payments, if comments are of too great a significance. In this case, every effort shall be made during follow-up action between the Contractor and the Omaha District to resolve conflicts and problems such that documents can be fully accepted. However, if final submittal(s) are incomplete or deficient, requiring correction by the Contractor and resubmittal for review, the cost of rehandling and reviewing will be deducted from payment due the Contractor at the rate of \$1000.00 (for each design discipline requiring resubmittal) per submittal. "Design Disciplines" in this paragraph consist of Structural, Electrical, and Civil/Site work.

#### 3.7.4 Delays

Delays caused by the Contractor in completion of the 60 percent design, the 100 percent design or the 100 percent corrected design will not be considered as valid reason to delay completion of the entire design. The Government may not be held liable for delays caused by re-submittal efforts caused by designs submitted, which are rejected by the reviewers.

#### 3.7.5 Reproduction (For Construction):

Upon the Government's completion of the review of the 100% Corrected Design submittal, the Contractor shall reproduce copies of the design documents (accepted for the purposes of beginning construction), subject to the incorporation of the Corrected 100% design review comments. The Cover Sheet of the Contractor prepared drawings shall bear the stamp or seal and signature of the registered architect or appropriate engineer responsible for the work and proposed to meet the RFP requirements. The date on each drawing shall reflect the month and year that the drawings were cleared for the purposes of beginning construction. The Cover Sheet of the drawings, Cover Sheet of the Specifications, and Cover Sheet of the Design Analysis shall include the date that the design documents were cleared for the purposes of beginning construction. The Contractor shall provide corrected 100 percent specifications in both hard copy and electronic media (Specsintact Software Version 3.1.382 or later). Distribution shall be as indicated above. The originals will be retained by the Contractor for recording of as-built conditions. Upon completion of the project, the accepted design documents corrected to reflect as-built conditions shall be supplied to the Government. See Section 01040 AS-BUILT DRAWINGS for as-built drawing requirements.

#### 3.7.6 Government Design Review and Acceptance

##### 3.7.6.1 Design Review Conference and Post-Design Review Conference Action:

All design review conferences shall be held on U.S. Air Force Academy. Government personnel will forward review comments to the Contractor for discussion and resolution prior to the design review conference. Copies of comments, annotated with comment action agreed on, will be made available to all parties before the design review conference adjourns. Unresolved

problems will be resolved by immediate follow-on action at end of conferences. Valid comments will be incorporated. Upon satisfactory Government review of the 100 percent corrected design documents, the Omaha District will formally provide Government acceptance necessary to initiate construction. The Government, however, reserves the right to not accept design document submittals and to withhold design payments, if comments are of too great a significance. In this case, every effort shall be made during follow-up action between the Contractor and the Omaha District to resolve conflicts and problems such that documents can be fully accepted. However, if final submittal(s) are incomplete or deficient, requiring correction by the Contractor and resubmittal for review, the cost of rehandling and reviewing will be deducted from payment due the Contractor at the rate of \$1000.00 (for each design discipline requiring resubmittal) per submittal. The Contractor shall submit to the Contracting Officer within five (5) calendar days, two two (2) copies of meeting minutes summarizing major decision points and issues which requires resolution and the action office. Annotated comments shall be attached to these minutes.

#### 3.7.6.2 Complete Design Documents

The Contractor shall submit complete design documents in the same quantity and to the same offices listed above in paragraph **"Distribution of Design Documents for Conformance Review"**, for each corrected 100 percent design submittal (one or more) until the Government is satisfied that all review comments have been addressed and resolved.

#### 3.7.6.3 Accuracy and Completeness of Design

Reviews by the Government of the design documents shall not be construed to be an endorsement of the accuracy or completeness of the design. Design deficiencies or omissions in the accepted design shall be the responsibility of the Contractor.

#### 3.7.7 DD Form 1354, Transfer and Acceptance of Military Real Property

The Contractor shall provide, for acceptance, a completed DD Form 1354 "Transfer and Acceptance of Military Real Property" (Copy attached at the end of this section) with the 100 percent corrected design documents. DD Form 1354 shall be filled out in accordance with Draft Army Pamphlet 405-45 "Real Property Inventory Management", Table B-16 "Preparation of DD Form 1354" (Copy attached) and Army Pamphlet 415-28 "Guide to Army Real Property Codes" (Copy is available at the following website: <http://www.usapa.army.mil/gils/>). The number of copies of the completed DD Form 1354 shall be same as that required for the 100 percent corrected design documents.

### 3.8 REVISIONS TO THE ACCEPTED DESIGN

(a) The accepted design will be used by all parties involved in construction and in administration of the contract. Therefore, it is imperative that the design documents be kept up to date and an effective system of making and distributing changes be implemented. Since changes to the design increase risk of construction errors and deplete available administrative resources, every effort shall be made to minimize revisions to the accepted design. One of the measures of the Contractor's effectiveness of management will be how well the goal of minimizing changes to the accepted design is met. The use of effective quality control during design, and utilization of experienced and capable designers are some of the means that are expected to be used to accomplish this goal.

(b) If revisions to the accepted design become necessary, the procedures described in Section 01330 SUBMITTAL PROCEDURES will be used to accomplish the revisions. The revisions will be considered a "Variation" and shall be submitted as a "G-RE" submittal. All the requirements in paragraph: "Variations" in Section 01330 SUBMITTAL PROCEDURES will apply to revisions to the accepted design. All design analysis and calculations necessary to establish that the proposed revision satisfies applicable design requirements shall be included in the submittal.

Attachment A

[Contractor's Letterhead]

[Date: \_\_\_\_\_]  
[Contract No. \_\_\_\_\_]

[Reviewing Component Address]

Subj: DESIGN CERTIFICATION AND TRANSMITTAL FOR  
[Project Title \_\_\_\_\_]  
[Project Location \_\_\_\_\_]  
[Contract No. \_\_\_\_\_]

Gentlemen

Enclosed are the following documents, which I hereby certify are in compliance with the RFP requirements of the subject construction contract and can be used to commence construction subject to Government approval:

1. Design Drawings
2. Project Specification
3. Design Analysis
  - a. Civil
  - b. Water Supply and Wastewater Collection
  - c. Architectural
  - d. Interior Design
  - e. Structural
  - f. Mechanical
  - g. Fire Protection
  - h. Electrical
  - i. Environmental Protection, Compliance and Permits
  - j. Health and Safety
  - k. Sustainable Design
4. Submittals Register

[Typed Name and Signature of an  
Officer of the Contractor's Company]

5. All other Design Submittals
6. Deviations

Copy to:  
[As standard with the Contractor]

-- End of Section --



## CHAPTER 4 ACCOUNTING FOR REAL PROPERTY (MANUAL)

### Section I. GENERAL

**4-1. Purpose.** This chapter provides manual procedures for the general administration and accounting of real property at installation level by the FE. Prescribed are—

- a. Records requirements.
- b. Records maintenance.
- c. Recording methods.
- d. Transaction documents.
- e. Accounting procedures for—
  - (1) Unit of measure quantity.
  - (2) Dollar value.

**4-2. Integrated Facilities System (IFS).** The IFS will be extended progressively to all Army installations during the next several years. Conversion to the IFS automated computer system will alter the application of the provisions of this chapter. To provide for continuity and application of the provisions of this regulation under both the manual and computerized systems, guidance on accounting for real property is presented in this chapter for installations operating under the manual system and in chapter 5 for installations operating under IFS. Implementation of the IFS at any installation will

result in the provisions of the affected paragraph in this chapter being supplanted by the relevant paragraph in chapter 5, with use of the appropriate forms listed in appendix P.

**4-3. Policy.** a. Division, district, and area engineers, or their designees, or other responsible individuals of Department of the Army agencies authorized to execute Army construction, will be governed by this chapter of the regulation.

b. On transfers of real property to other Department of Defense agencies DA Form 2877 (Real Property Record) prescribed in section III will not be prepared.

c. At Government-owned contractor-operated (GOCO) installations and industrial plants, real property records required for financial accounting purposes will be maintained as prescribed in chapters 2 and 3, AR 735-72.

d. The installation construction data file (all property cards; maps, drawings, plans, and specifications; leases; contracts and other necessary data) pertaining to completed construction will be maintained in the Office of the Facilities Engineer.

### Section II. ACCOUNTABLE OFFICER AND REAL PROPERTY RECORDS

**4-4. Accountable officer.** a. The FE is the accountable officer for facilities engineering activities. This responsibility includes the maintenance of accountable records for all real property at the installation. Supplies for Real Property Maintenance Activities (RPMA) will be under the control of the FE.

b. The accountable property officer may be the FE, Deputy FE, or any other officer or Department of the Army Civilian (DAC) assigned to facilities engineering functions. However, the individual assigned to this position must be a US citizen. Request for waiver to this requirement must be approved by the appropriate MACOM. Civilians may be appointed to serve as accountable property officer when appropriate and approved by the installation commander in compliance with the provisions of paragraph 1-6, AR 735-5.

**4-5. Real property records.** Records of real property provide the FE with—

a. Maps and data on the physical plant, which indicate the extent of facilities engineering activities.

b. Base data on the physical plant and inventories for use in planning, budgeting, preparation of facilities engineering technical data and operating reports, real property inventory reports, and other required reports.

**4-6. Voucher register and file.** A voucher register of all vouchers pertaining to the facilities engineering real property account at an installation will be maintained on DA Form 272 (Register of Vouchers to Stock Record Account). Vouchers will be registered within one working day after receipt.

a. *Registering.* All documents which evidence the acquisition, issue, and disposition of real property will be registered.

*b. Numbering.* Vouchers will be numbered serially, with a new series starting at the beginning of each fiscal year.

*c. Posting.* At the time of posting, the following information will be indicated on the voucher. Rubber stamps may be utilized to indicate such data.

- (1) Record to which posted (i.e., real or stock).
- (2) Data posted.
- (3) Initials of posting clerk.

*d. Filing.*

(1) Vouchers will be filed in numerical sequence and secured in binders, preferably in lots of 100 for convenience in handling. Supporting papers will be limited to minimum essential requirements, such as packing slips for vouchers indicating receipt of supplies. When information is required from an individual voucher, the entire binder will be charged

out.

(2) Real property record cards, transfer or acquisition forms, maps, plans, and drawings are all interdependent and must be filed together as an integral part of the FE's administrative records.

*e. Missing vouchers.* When it is determined that a voucher is missing or lost, a statement signed by the accountable officer will be placed in the voucher file in lieu of the missing voucher, and the word "lost" entered in the "check" column of the voucher number assigned. The statement will include the voucher number, name of consignee or consignor, the description of the lost item, the date the number was assigned, and such other identification as may be available. Circumstances of loss and action taken to locate the voucher or a copy thereof will be included.

### Section III. TRANSFER OF CONSTRUCTION

**4-7. General.** Transfer, inspection, and acceptance of completed construction will be accomplished in accordance with paragraph 3-4, AR 415-10. A DD Form 1354 (Transfer and Acceptance of Military Real Property) will be prepared by the District Engineer for all real property, regardless of how that property was funded.

**4-8. Transfer form.** *a. Preparation.* A DD Form 1354, describing the work, will be prepared as prescribed in appendix B for the particular type of transaction concerned. Sufficient copies of the form will be prepared to meet the requirements set forth herein. As applicable, the DD Form 1354 will be supported by a list of items designated as "equipment-in-place" that were incorporated in the completed structure. The list will reflect the data required for completion of DA Form 661 (Record of Equipment-in-place). A listing of all deficiencies which require corrections will also be shown. The equipment-in-place records will be provided to the installation accountable officer responsible for the individual property listed thereon for maintenance of the DA Form 661 records.

*b. Acceptance.* After accomplishment of Item 27 (Statement of Completion), the DD Form 1354, with applicable supporting data, will be forwarded to the FE for acceptance of the completed construction. He will evidence acceptance by signing in Item 28 (Accepted By) of the DD Form 1354.

**4-9. Construction data items.** At the time of transfer of the completed construction, a complete

set of real property record cards (para 4-22), all maps, drawings, plans and specifications and lists of equipment-in-place, if pertinent; copies of leases, if applicable; contracts, guarantees given by the contractors or material vendors; manufacturer's catalogs and operating and maintenance manuals or instruction; and keys to doors, special enclosures, water valves, and fire hydrants will be furnished to the responsible individual accepting the transferred construction.

**4-10. Recording final cost.** Since final cost normally is not known at the time of transfer of construction by the District Engineer, the cost shown on the DD Form 1354 is based on the best estimate. When the actual cost of construction is ascertained, the District Engineer will furnish the FE with a final cost of construction report on DD Form 1354. The Facilities Engineer will voucher the form, and it will be used to update the estimated costs previously furnished.

**4-11. Beneficial occupancy.** *a. Acceptance for occupancy.*

(1) When facilities under construction are accepted for beneficial occupancy prior to formal transfer on DD Form 1354, workload and cost schedules in operating programs and budget submissions will include the performance factor data in the BP 1000 and J, K, L, M, series of accounts from such facilities from the date of acceptance for beneficial occupancy.

(2) A suggested procedure for recording actions

prior to formal transfer of the property is to prepare a "Memorandum Real Property Record Card" showing performance factor quantities furnished to those responsible for preparation of cost and performance reports and operating programs and budget data. This would make it possible to continue to reconcile performance reports and operating programs.

*b. Inventory recording.* Data as prescribed in *a*, above, will be reflected in the Inventory of Military Real Property upon acceptance of the facilities for beneficial occupancy.

**4-12. Deficiencies after transfer.** *a. Construction by Corps of Engineers.* Design and/or construction deficiencies should be identified prior to the Post-Completion Inspection (PCI). If no PCI is scheduled, post-acceptance deficiencies should be reported directly to the supporting district. Installation commanders will report promptly any significant deficiencies which were discovered after acceptance, and were not noted on the transfer document. This detailed report will be in writing and will contain complete information identifying the work contract number, nature of deficiency, date discovered, corrective action instituted, if any, and request for assistance from the supporting district, if such is desired. The report will be accompanied by sketches or photographs, if pertinent, and will be forwarded through the appropriate operating agency commander to the supporting district.

*b. Construction by other than Corps of Engineers.* Deficiencies in construction accomplished by an agency other than the Corps of Engineers will be reported as in paragraph *a*, above, except that the report will be forwarded through the appropriate operating agency command to the agency which accomplishes the construction.

**4-13. Transfer of purchased real property.** Real property acquired by purchase or condemnation proceedings will be transferred by the District Engineer on DD Form 1354. The DD Form 1354 will be supported by a list of equipment-in-place, real property record cards, and reproducible prints of final project maps. If initial alterations have been accomplished by the District Engineer, transfer forms will reflect the costs thereof and will be supported by plans and drawings showing the alterations. Cost information will be furnished in accordance with paragraph 4-10.

**4-14. Transfer of leased real property.** Real property acquired by lease or similar instrument will be transferred by the District Engineer on DD Form

1354. The DD Form 1354 will be supported by certified copies of all leases. If initial alterations have been accomplished by the District Engineer, the DD Forms 1354 will reflect the costs thereof and will be supported by a list of equipment-in-place, real property record cards, maps, plans, and drawings. A file of all active leases will be maintained.

*a.* Except as provided in *c* below, a separate set of real property record cards (para 4-22) will be maintained for each leased facility.

*b.* All additions made by the Army to leased premises will be recorded as being Government-owned.

*c.* Where facilities are leased for a short period (not over 3 months), preparation of real property record cards is not required. Accountability will be maintained by vouchering and filing in a jacket file all acquisition and disposal documents. A memorandum will be placed in the regular voucher file for each such voucher, indicating its number and location. When the lease has been terminated and disposition of property completed, the completed file documents will be retained for audit.

**4-15. Reactivation of excess installations.** *a. District Engineer.* The District Engineer charged with custody of an excess installation which has been scheduled for reactivation will prepare a DD Form 1354. The DD Form 1354 will contain the notation:

To effect transfer of \_\_\_\_\_, restored  
(name of installation)  
to active status, and all records pertaining thereto.

(1) It will not be necessary to list the real property on the transfer form.

(2) A copy of the current Inventory of Military Real Property report will be attached to the DD Form 1354.

(3) Copies of the directive changing the status of the installation will accompany the DD Form 1354. The transfer will also include all supporting construction data and items (para 4-9).

*b. Facilities Engineer.* The FE designated to reestablish and maintain accountability for the real property will accept the transfer as set forth in paragraph 4-8b.

(1) A voucher number will be assigned to the transfer form. An entry will be placed in the voucher register reading: "DD Form 1354, Reestablishment of Accountability."

(2) The DD Form 1354 and the directive changing the status of the installation will be filed in the voucher files.

c. *District Engineer-Facilities Engineer.* A physical inventory of the real property covered by the transfer form will not be required prior to the time for transfer, but will be initiated and completed by the FE as soon thereafter as conditions will permit.

4-16. Construction accomplished by FE a. A DD Form 1354, prepared by the FE, will be used to record new units or changes to real property resulting from construction by:

- (1) Contract.
- (2) Installation personnel.
- (3) Troop units.

b. Acceptance of the construction will be evidenced by the signature of the FE in Item 28 ("Accepted By").

c. Necessary changes to the real property records (para 4-22) will be posted from the vouchered DD Form 1354.

d. Information copies of the DD Form 1354 will be furnished to the District Engineer and the operating agency commander, as applicable.

4-17. Real property of nonappropriated fund or non-Army agencies. a. *Accountability.*

(1) *General.* Accountability for facilities constructed on property owned or leased by the Department of the Army by nonappropriated fund or non-Army agencies will be recorded on real property records (para 4-22).

(2) *Exception.* Where facilities are constructed on Army-owned or -leased property by private individuals or commercial concerns pursuant to contract with a nonappropriated fund or non-Army agency, ownership (accountability) of the facilities may be retained by such agency for the time necessary for the proper performance of the provisions of the contract.

b. *Installation real property records.*

(1) When it is determined that accountability for facilities referred to in a, above, will rest with the Government, a DD Form 1354 will be prepared listing the real property. An explanation of the action involved will be entered in Item 26 ("Remarks") of the transfer form. Examples of such action are:

(a) Construction for which the nonappropriated fund or non-Army agency is not retaining ownership (para a(2) above).

(b) Real property transferred to the Government in lieu of removal.

(c) Any nonappropriated fund or non-Army agency real property abandoned on the installation.

(d) Real property originally on the site when

acquired by the Government but which was not listed in the acquisition documents furnished by the Division Engineer.

(e) Real property for which ownership is in doubt or cannot be traced.

(2) The transfer form will be supported by a list of equipment-in-place. A copy of DD Form 1354 will be forwarded to the District Engineer for necessary action in securing a quitclaim deed from the owner to protect the Government's interest in the property.

c. *Removal of nonappropriated fund or non-Army agency property.* Agencies retaining ownership of real property at Army installations (a(2) above) will be notified of any contemplated disposal action. The notification will serve as advice to the agency to be prepared to remove the property. Removal will be made pursuant to the terms of authority under which the construction was accomplished. In lieu of removal, the agency may elect to transfer ownership to the Government, subject to Government acceptance.

4-18. *Research and development facilities.* Facilities constructed for research and development activities will not be recorded on the real property records when information available at the time for construction indicates that the facilities will be destroyed or rendered useless as items of real property. In the event that the real property facilities are usable after their research and development purpose has been served, they will be recorded on a DD Form 1354 and accounted for as prescribed in paragraph 4-30.

4-19. *Other construction.* Any real property which has been constructed from other than Military Construction, Army (MCA) or Operations and Maintenance, Army (OMA) funds, will be listed on a DD Form 1354. A statement of the conditions under which the property was constructed will be included in Item 26 ("Remarks") of the transfer form. Acceptance of the construction will be evidenced by the signature of the Facilities Engineer in Item 28 ("Accepted By"). Postings to the real property record cards will be made from the vouchered DD Form 1354. Funds available for operation and maintenance of facilities are applicable for the maintenance of such real property after it has been recorded on the real property records.

4-20. *Manufacturers' and construction warranties.* Manufacturers' warranties on integral components or movable items of major equipment which are installed as new equipment subsequent to

completion of construction or alteration, or as a replacement item, will be obtained from the vendor concerned and made a part of the engineering data file of the installation (para 4-30). Responsible individuals will insure that these warranties are properly exercised during their life, as the need arises. Enforcement of construction warranties, guarantees and bonds on new construction and alteration projects is the responsibility of the FE. The FE will be assisted by the supporting district, when required, in assuring that contractors honor their con-

struction warranties.

**4-21. Energy assessment.** The installation's increased or decreased energy requirement resulting from transfer of construction will be determined as soon as practical and the installation commander informed. Should the actual energy consumption differ from estimates by more than 10 percent, the reason(s) for the difference should be ascertained, so that the accuracy of future estimates can be improved.

#### Section IV. RECORDING

**4-22. Real property records.** The records prescribed herein will be established for all real property of the Department of the Army within the purview of this chapter (b, below). Real property records will be maintained current in the Facilities Engineer Office, and consist of:

a. DD Form 1354 (Transfer and Acceptance of Military Real Property). This form serves as the document for—

(1) Entry of data relative to newly constructed or otherwise acquired items of real property into the record system.

(2) Transfer of accountability for real property.

(3) Recording changes to real property record cards (b, below) for increases or decreases to base data and/or original cost resulting from capital improvements and capital decreases.

b. *Real property record cards.* Real property record cards provide, for each separately identified item of real property, a convenient summary of units of measure, the original cost to the Government (currently adjusted), and certain technical data required for service purposes. This chapter provides for the use of a single real property record card (DA Form 2877) for recording all real property facilities and additions and deletions thereto. All new facilities accepted by the FE will be recorded on DA Form 2877.

c. *Engineering data file.* This file consists of maps, plans, drawings, and specifications which relate to the real property (para 4-30).

**4-23. DD Form 1354 (Transfer and Acceptance of Military Real Property).** As DD Form 1354 is a multipurpose form, instructions for its preparation are given in three parts to cover the three primary purposes (uses) of the form. First, when the form is prepared by the District Engineer to cover the transfer of completed work to the using service. Sec-

ondly, when the form is prepared by the FE to cover transfer and acceptance of work of a construction nature accomplished by the FE. Third, when the form is prepared by either the District Engineer or FE to cover various miscellaneous actions involving real property. Preparation and processing of DD Form 1354 will be as set forth in appendix B, and paragraphs 4-7, 4-8 and 4-16.

**4-24. Real property record-railroad.** A DA Form 2877 will be prepared on all rail trackage on the installation, including railroad bridges, trestles, and tunnels. Preparation will be as set forth in appendix C.

**4-25. Real property record — buildings.** An individual DA Form 2877 will be prepared for each building on the installation. (Tent frames, hutments, and family housing trailers installed for ready use will be recorded as miscellaneous structures.) Preparation will be as set forth in appendix C.

**4-26. Real property record — miscellaneous structures.** a. An individual DA Form 2877 will be prepared for:

(1) Wharves, piers, seawalls, levees, jetties, bulkheads, breakwaters, channels, docks, ferry slips, dock warehouse, causeways, and similar structures along waterways and water approaches.

(2) Utility structures such as elevated and ground storage tanks, pumping stations, impounding dams, water treatment plants, settling tanks, Imhoff tanks, trickling filters, sludge digesters, sludge drying beds, percolation beds, septic tanks, ice plants, central air-conditioning plants, central heating plants, and electric generating plants.

(a) Interconnecting piping between utility structures, meter valves, pits, and diversion boxes comprising a utility plant on one site are considered a part of the plant and will not be recorded sepa-

ately.

(b) When miscellaneous facilities which are components of a complete utility plant are housed in one building, attach appropriate cards to the individual DA Form 2877 for the building.

(3) Permanent type training facilities such as obstacle courses, firing ranges and mock villages.

(4) All other miscellaneous structures, including swimming pools, fences, walls, flagpoles, detached loading platforms and ramps, concrete tent floors, tent frames, hutments, family housing trailers installed for ready use, fixed coalbins, and fixed kennels.

b. Posting to card will be as set forth in appendix C.

**4-27. Real property record-land.** a. An individual DA Form 2877 will be prepared, as appropriate, for each of the various land categories listed in table 1, AR 415-28.

b. Posting to card will be as set forth in appendix C.

**4-28. Real property record-surfaced areas.** a. An individual DA Form 2877 will be prepared for each category of surfaced or stabilized area listed in table 1, AR 415-28.

b. Posting to card will be as set forth in appendix C.

**4-29. Real property record-utility distribution systems.** a. An individual DA Form 2877 will be prepared for each type of utility distribution system identified in table 1, AR 415-28.

b. Posting to card will be as set forth in appendix C.

**4-30. Engineering data file.** a. *General.* Maps, plans, drawings, and specifications which constitute the engineering data file are not accountable records and will not be assigned voucher numbers. This file is the source for obtaining the base unit quantities required to be shown on the real property record cards.

b. *Responsibility.* A file of legible, reproducible

prints on durable material, comprising the items listed in paragraph d (1) through (8) below, will be maintained by the FE. In addition, detail items and the scope thereof (d, below) to be included in the engineering data file will be determined by the FE based on considerations of the characteristics and mission of the installation and relationship to the master planning program. Specific requirements are found in chapters 2 and 3, and appendix B, AR 210-20, Master Planning for Permanent Army Installations.

c. *Changes.* Any change (alteration, extension, addition, expansion, conversion) to a facility will require a print showing such change. On the print showing the change, reference will be made to the voucher number assigned to the DD Form 1354. The "change" print will be filed with the "as-built" print.

d. *Detail items.* In addition to the material prescribed in b and c, above, a file of prints or plans of detailed features of buildings, structures, grounds, and utilities systems will be maintained for planning, engineering, and operational requirements. Examples of material suitable for inclusion in the file are—

(1) Strip maps, profiles, sections, and other drawings giving essential dimensions and details of "as-built" features.

(2) Land management maps showing areas out-leased for grazing, agricultural, and other purposes.

(3) Lists of transformer and sub-station locations and capacities.

(4) Water valve location book.

(5) Storm and sanitary sewer manhole location guide.

(6) Guide prints showing tile fields and septic tanks, steam condensate return pumps, and valves.

(7) Specifications and catalogs.

(8) Any descriptive material considered to be an engineering necessity.

## Section V. ACCOUNTING

**4-31. General.** Accounting for real property will be on a quantitative (unit) and monetary (dollar) basis. For each separately identified item of real property, the real property record cards provide a convenient summary of units of measure (base data), original (acquisition) cost to the Government currently adjusted by cost of capital improvements and/or capital decreases, and certain technical data re-

quired for engineering purposes.

a. *Source records.* After transfer and acceptance of completed construction, real property record cards will be established from data on DD Forms 1354, leases, historical records, and other papers pertaining to real property. When the source of real property cannot be traced to some basic record, the property will be listed on DD Form 1354 with appropri-

## APPENDIX B

### PREPARATION OF DD FORM 1354

#### (TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY)

**B-1. General.** This appendix contains detailed instructions for filling in multipurpose form, DD Form 1354.

**B-2. Detailed instructions.** DD Form 1354 will be filled in as follows:

*a. Item 1 — From.* Enter the name of the entity (district, installation, etc.) performing the work.

*b. Items 2, 3, and 4 — Operating unit, district code, and operating agency.* Reserved for other than Army use.

*c. Item 5 — Date.* Enter the date the DD Form 1354 is prepared.

*d. Item 6 — Job number.* Enter appropriate Army job and directive number.

*e. Item 7 — Serial number.* Enter separate series of numbers, by fiscal year, for each installation to which the real property is transferred, e.g., for FY 1977, show 77-1, 77-2, etc.

*f. Item 8 — Contract number.* Self-evident.

*g. Item 9 — To.* Enter full name of installation where work was performed.

*h. Items 10-14 — Operating unit, district code, operating agency, accounting number and accountable office number.* Reserved for other than Army use.

*i. Item 15 — Type of transaction.*

(1) Insert an "X" in the appropriate box of Block "A" to indicate whether transaction involves new construction, existing facilities, or capital improvements to existing facilities. If the "Other" box is used, explain the transaction in Item 31, "Remarks".

(2) Additionally, in the case of new construction, insert an "X" in the appropriate box of Block "B" to indicate whether transaction is being made at time of beneficial occupancy, physical completion, or financial completion. If the "Other" box is used, explain the transaction in Item 31, "Remarks".

*j. Item 16 — Project number.* Enter the code number, keyed to the fiscal year, assigned to identify the project. Additionally, for construction, enter the public law authorizing the work.

*k. Item 17 — Item No.* Identify each single entry with an item number.

*l. Item 18 — Category code.* Enter the applicable

5-digit category code number, as shown in Table 1, AR 415-28, for each facility listed under Item 19. (Not more than one category code will be listed as a line item (Item 17)).

*m. Item 19 — Facility.* Enter the category description for the facility as set forth in the "Category short title" column Table 1, AR 415-28.

*n. Item 20 — Number of units.* Self-evident.

*o. Item 21 — Type.* Enter the type of construction: "P" for permanent; "S" for semipermanent; and "T" for temporary.

*p. Item 22 — Unit of measure.* Enter the unit of measure as set forth in the "Area" column of table 1, AR 415-28 for the facility.

*q. Item 23 — Total quantity.* Enter the total quantity of each unit of measure entered under 22.

*r. Item 24 — Cost.* Enter the appropriate cost for each line item entry except for items of equipment-in-place and portable structures.

(1) In instances where a DD Form 1354 is prepared that lists items carrying costs which in some cases may be final and in others may be preliminary, each cost figure by line item will carry an alphabetical suffix of "(P)" for "preliminary" or "(F)" for "final."

(2) In instances of capital improvements to real property previously accounted for, enter only the amount of increase in value of the real property — that is, the amount by which the general ledger balance is to be increased, not the new value of the real property.

*s. Item 25 — Drawing numbers.* Enter the basic numbers assigned the standard drawings involved. If nonstandard drawings are involved, include reference to appropriate drawing files in "Remarks," Item 26.

*t. Item 26 — Remarks.* Self-evident.

*u. Item 27 — Statement of completion.* Enter the title of the signing responsible individual.

*v. Item 28 — Accepted by.* Enter the title of the signing responsible individual.

*w. Item 29 — Property voucher number.* Enter the voucher number assigned to the DD Form 1354.

*x. Item 30 — Construction deficiencies.* Enter significant design or construction deficiencies.

*y. Item 31 — Remarks.* Self-evident.

**B-3. Processing.** *a. Transfer of construction by the District Engineer.* Instructions are detailed in paragraphs 4-7 and 4-8 (manual) or 5-7 and 5-8 (automated).

*b. Transfer of construction accomplished by the Facilities Engineer.* Instructions are detailed in paragraph 4-16 (manual) or 5-16 (automated).

*c. Miscellaneous actions involving real property.* Actions involving acquisitions, construction, disposal, or other changes to real property not covered in *a* and *b*, above, will be recorded on DD Form 1354. Examples of such actions are:

✓(1) Transfers of purchased or leased real property (para 4-13 and 4-14 or 5-13 and 5-14).

(2) Reactivation of excess installations (para 4-15 or 5-15).

(3) Transfers of real property of nonappropriated fund or non-Army agencies to the Government (para 4-17 or 5-17).

(4) Transfers of accountability for usable research and development facilities (para 4-18 or 5-18), and acceptance of other construction (para 4-19 or 5-19).



TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY														Form Approved OMB No. 0704-0188				
PAGE                      OF                      PAGES																		
Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, Va 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.																		
1. FROM (Installation/Activity/Service and Zip code)				2. OPERATING UNIT		3. DISTRICT CODE		4. OPERATING AGENCY		5. DATE		6. JOB NUMBER		7. SERIAL NUMBER		8. CONTRACT NUMBER		
9. TO (Installation/Activity/Service and Zip code)				10. OPERATING UNIT		11. DISTRICT CODE		12. OPERATING AGENCY		13. ACCOUNTING NUMBER		14. ACCOUNTABLE OFFICE NUMBER		15. TYPE OF TRANSACTION			16. PROJECT NUMBER	
														<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> A. <input type="checkbox"/> NEW CONSTR.  <input type="checkbox"/> EXISTING FAC.  <input type="checkbox"/> CAPITAL IMP.  <input type="checkbox"/> OTHER (Specify) </div> <div style="width: 45%;"> B. <input type="checkbox"/> BENF/O  <input type="checkbox"/> PHYSICAL COM.  <input type="checkbox"/> FINAN. COM.  <input type="checkbox"/> OTHER (Specify) </div> </div>				
ITEM NO.	CATEGORY CODE	FACILITY (Category description)	NO. OF UNITS	TYPE	UNIT OF MEAS.	TOTAL QUANTITY	COST	DRAWING NUMBERS	REMARKS									
17	18	19	20	21	22	23	24	25	26									
27. STATEMENT OF COMPLETION: The facilities listed hereon are in accordance with maps, drawings, and specifications and change orders approved by the authorized representative of the using agency except for the deficiencies listed on the reverse side.										28. ACCEPTED BY (Signature)					DATE			
TRANSFERRED BY (Signature)					DATE					TITLE (Post Engr./Base Civ. Engr./Navy Rep.)					29. PROPERTY VOUCHER NUMBER			
TITLE (Area Engr./Base Engr./DPWO)																		

30.

## CONSTRUCTION DEFICIENCIES

31. REMARKS

## INSTRUCTIONS

This form has been designed and issued for use in connection with the transfer of military real property between the military departments and to or from other government agencies. It supersedes ENG Forms 290 and 290B (formerly used by the Army and Air Force) and NAVDOCKS Form 2317 (formerly used by the Navy).

Existing instructions issued by the military departments relative to the preparation of the three superseded forms are applicable to this form to the

extent that the various items and columns on the superseded forms have been retained. Additional instructions, as appropriate, will be promulgated by the military departments in connection with any new items appearing hereon.

With the issuance of this DD form, it is not intended that the departments shall revise and reprint manuals and directives simply to show the number of this DD form. Such action can be accomplished through the normal course of revision for other reasons.

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## SECTION 01336

### 60 PERCENT DESIGN REQUIREMENTS

#### PART 1 60 PERCENT DESIGN SUBMITTALS

For general submittal requirements, See Section 01332 SUBMITTALS FOR DESIGN.

##### 1.1 SITE PLANNING

###### 1.1.1 Drawings

###### 1.1.1.1 Location Plan and Vicinity Map

The Location Plan and Vicinity Map provided in the Request For Proposal (RFP) shall be updated as necessary and included in the drawings. The Location Plan shall include the Contractor's Access Route, Staging Area, and the Project Site.

###### 1.1.1.2 Removal Plan

The removal plan will show the existing physical features and condition of the site before construction. Each physical feature to be removed shall be hatched as indicated on the standard legend sheet, a legend on the removal plan, and properly noted: to be removed, to remain, or to be relocated. The Removal Plan shall be prepared at the same drawing scale and use the sheet boundaries as the Site Plan.

###### 1.1.1.3 Site Plan

The Site Plan shall show all the site layout information necessary to field locate the building, parking lots, roads, sidewalks, and all other appurtenances to be constructed as part of the project. All major site work to be constructed will be dimensioned for size and location. The Site Plan will identify all site-related items such as: curbs, pavements, walks, bollards, trash enclosures, retaining walls, chiller units, electrical transformers locations, etc. in accordance with a standard legend sheet or with additional legends or notes. Drawing scales of between 1:250, 1:300, and 1:400 are acceptable scales for the Site Plan. The contractor shall consider the project's construction area, drawing legibility, number of sheets required in choosing the drawing scale. The Site Plan, prior to adding the dimensions and notes, should serve as the base sheet to other Plans, such as: Utilities Plan, Grading and Drainage Plans and Landscape Plan. Existing and proposed contours or utility lines shall not be shown on Site Plan. Physical features that will remain after the proposed construction has been completed shall be shown. This plan, or the Location Plan, will also show any free zones, construction limits, etc. Whenever the Site Plan occupies more than one sheet of drawings, a Key Plan shall be included. Additional plans showing specific areas of the site in smaller scales can be included if more detail is necessary.

###### 1.1.1.4 Site Details

The Contractor shall provide designs and details as necessary for site furnishings, accessories, accessible parking stalls and ramps, bollards,

signage, striping, and any other site structure or item requiring a detail for clarity and construction accuracy.

#### 1.1.1.5 Landscape Plan

A detailed Landscape Plan showing trees, shrubs, ground covers, seeded and sodded areas, shall be prepared by the Contractor. The Landscape Plan shall be prepared by a fully qualified, experienced professional Landscape Architect. The Contractor shall specify types of plant materials that are locally grown, commercially available and acclimated to the project environment. The Landscape Plan shall include a plant materials schedule or listing. This schedule shall include botanical names, common names, key, size and the method of transplanting. The Landscape Plan shall also show all un-surfaces ground areas disturbed by construction within the project limits with these areas shown to be seeded, sodded, or mulched as required.

#### 1.1.1.6 Landscape Details

The Contractor shall verify the methods of planting to meet the project site/installation requirements and provide the necessary Landscape Details to perform the contract design work. Details shall reflect local practices and conditions for installation.

#### 1.1.2 Specifications

Provide a listing by title and number of all Technical Specifications proposed for use in the final site design.

#### 1.1.3 Design Analysis Narrative

Design analysis shall include the following:

##### 1.1.3.1 Design References

Design references used in preparing the site design.

##### 1.1.3.2 Basis, Specific Goals, Objectives and Priorities For Site Design

The Design Analysis should give the basis, specific goals, objectives and priorities for site design of the project. Identify, explain and document use of design criteria and how the design meets goals, objectives and priorities. Identify the preferred site development concept. Document pollution prevention measures and other environmental considerations made during design. The 60 percent Design Analysis must be approved and accepted before Final Design.

#### 1.2 CIVIL

##### 1.2.1 Drawings

##### 1.2.1.1 Grading and Drainage Plan

A preliminary grading and drainage plan showing the proposed layout of all new culverts and storm drains shall be provided at the same scale as the site plan. Existing grading contours shall be indicated at 0.25 meter contour intervals. Tentative new grading contours shall be shown. Indicate proposed finished floor elevation of the new buildings. Provide location and description of benchmarks and indicate vertical and horizontal



datums.

#### 1.2.1.2 Grading Sections

Provide grading sections through the site showing finished and existing grades, pavement sections in detail, slope percentage, ditches, slopes of finished grades, finish floor elevations in the new building, and identification of main features such as parking areas, building, and walks, etc.

#### 1.2.1.3 Typical Pavement Sections

Provide typical pavement and road sections and details showing interface between new and existing pavements and new pavements of different sections.

#### 1.2.2 Specifications

Provide a listing by title and number of all Technical Specifications proposed for use in the final civil design. List shall be coordinated with the requirements of Section 01002.

#### 1.2.3 Design Analysis Narrative

Design analysis shall include the following:

##### 1.2.3.1 References

Design references used in preparing the civil design.

##### 1.2.3.2 Grading

A narrative of the grading design and criteria used. Provide documentation that the grading design has been coordinated with the ball field design.

##### 1.2.3.3 Pavements

A narrative of the pavement design and criteria used plus design calculations used to obtain the pavement design.

##### 1.2.3.4 Drainage

A narrative of the drainage design and criteria used. Include information on the storm drain and culvert pipe materials anticipated to be used.

##### 1.2.3.5 Basis, Specific Goals, Objectives and Priorities For Civil Design

The Design Analysis should give the basis for the civil design and should establish specific goals, objectives and priorities for civil design of the project. Identify, explain and document use of design criteria and how the design meets goals, objectives and priorities. Identify the preferred site development concept. Document pollution prevention measures and other environmental considerations made during design. The 60 percent Design Analysis must be approved and accepted before Final Design.

#### 1.2.4 Design Analysis Calculations

##### 1.2.4.1 Storm Drainage System Calculations

Storm Drainage System Calculations shall include the following:

- a. Drainage area map showing boundaries of each drainage area and respective drain inlet or culvert.
- b. Storm run-off calculations for each drainage area.
- c. Preliminary storm drain pipe sizing calculations.

### 1.3 GEOTECHNICAL

See Structural Design Requirements.

### 1.4 WATER SUPPLY AND WASTEWATER

#### 1.4.1 Drawings

##### 1.4.1.1 Water Distribution and Sewage Collection Systems Plan (including building services)

Provide all existing utilities and above ground features which may pose as an obstacle (i.e., water, sewer, gas, electrical, etc.) on the basic site plan layout. Exclude siting notes and dimensions from the plan. Provide all proposed new water and sewer lines with preliminary sizes. This shall include all new service lines up to the 1.5 meter building line. Show the proposed locations of all new manholes, fire hydrants, valves (including PIV's), and connection points.

#### 1.4.2 Specifications

Specifications shall be coordinated with the plans and include all items. Provide a listing of specifications to be provided. Provide a complete copy of special sections to cover those subjects for which no UFGS guide specifications are used or available.

#### 1.4.3 Design Analysis Narrative

Design analysis shall include the following:

##### 1.4.3.1 References

Provide design references used in preparing the water and wastewater design.

##### 1.4.3.2 Water Supply and Distribution Systems

A narrative of the water supply and distribution systems design and applicable criteria used shall be provided. Include the peak and average domestic demands, the fire flow required and the available flow and residual pressures. A description of the water distribution system, a listing of allowable piping materials, hydrant flow test data and preliminary calculations necessary to support equipment, piping sizes, fire and domestic demands, etc., shall be provided.

##### 1.4.3.3 Wastewater and Sewers

Based on existing information the sanitary sewer system in the vicinity of the proposed facility is assumed to be adequate to carry the flows expected to be generated by the new facility. A narrative of the wastewater supply design and applicable criteria used shall be provided. Include the preliminary calculations used to design the average and peak contributing

flows. Field verify the available capacity and full flow capacity of the existing system to ensure that it will be adequate for the flows generated by the new facility. Include the available capacity and full flow capacity in the design analysis. Preliminary calculations necessary to support equipment and piping sizes and a listing of allowable piping materials shall be provided.

#### 1.4.4 Gas Distribution

A narrative of the gas distribution design and applicable criteria used shall be provided. Include the peak and average flow demands, the flow-rate required and the available pressures. A description of the gas distribution system, a listing of allowable piping materials, test data and preliminary calculations necessary to support equipment, piping sizes, flow demands, etc., shall be provided similarly to water supply and distribution system.

### 1.5 ARCHITECTURAL

#### 1.5.1 Drawings

Sixty percent architectural drawing submittal shall be a complete set of architectural drawings without large scale details. All other drawings shall be complete except referencing of the large scale details. AutoCad drawing standards shall match those of the Omaha District. The Omaha District standard title block and border sheet shall be used for the design.

##### 1.5.1.1 Floor Plans

Provide a double line Floor Plan, drawn at the largest scale practicable to include the entire building on a single sheet. See paragraph on Drawing Scales for plan scale requirements. Floor plans shall essentially be complete with the exception of large scale detail referencing. Floor plans shall be scaled double-line drawings showing the functional arrangement, poche, location of all openings and plumbing fixtures, all section cuts, wall types, all notes and leaders, all general notes, and all dimensions shall be completed. The plans shall indicate door swings, door numbers and window type; door and window schedules are required. A north arrow shall be shown on each floor plan. Enlarged toilet and stair plans shall also be included. The first composite plan sheet shall include a gross area tabulation comparing the actual square meters with the authorized square meters of the facility. Architect-Engineer suggestions for plan improvement shall be fully shown and justified. Include the following:

- Overall, control, and door/ window opening dimensioning.
- Match lines for combining individual portions of floor plans.
- Room names and numbers.
- Structural column or bay indicators.
- Wall and building section cuts.
- Door swings and door numbers.
- Window types.
- Area in square meters.
- All floor & wall patterns/ borders.
- General notes.

When dimensioning, use arrowheads, not dots or slashes. Where major structural elements are included as parts of architectural detailing, do not indicate sizes. These elements should all be fully defined as part of the structural design documents. Major elements of mechanical and

electrical equipment affecting room size or shape, shall be shown on the architectural plans to a practicable extent and coordinated with other respective disciplines. When applicable, Government-furnished, Contractor-installed, or Government-furnished and Government-installed items shall be shown as a dashed line.

#### 1.5.1.2 Reflected Ceiling Plans

Reflected ceiling plans shall be complete including all electrical lights, mechanical supply & diffusers, notes, complete legends and poche of all materials to be used. See paragraph on Drawing Scales for reflected ceiling plan scale requirements.

#### 1.5.1.3 Roof Plan

Roof plans shall be complete including all notes, legends, slope indications, gutter and downspout locations, and roof overflow drains. All elements located on the roof shall be coordinated with all disciplines. See paragraph on Drawing Scales for roof plan scale requirements. Roof mounted equipment should be limited to exhaust fans, vents, and intakes, no large pieces of equipment shall be allowed to be mounted on the roof.

#### 1.5.1.4 Building Elevations

Provide all building elevations complete showing the appearance and architectural treatment. Elevations shall be dimensioned to show total height, and relation to grade. Critical elevations such as top of finish floor, top of steel, etc. shall be indicated. All notes for materials shall be included. See paragraph on Drawing Scales for Exterior Building Elevation scale requirements.

#### 1.5.1.5 Building Sections

Building cross section and longitudinal sections shall be included to show general interior volumes, construction methods, and height of ceilings and partitions. Identify materials used and necessary dimensions. See paragraph on Drawing Scales for Building Section scale requirements.

#### 1.5.1.6 Wall Sections

Drawings shall include all wall sections and stair section conditions including corridors, showing vertical control elevations and dimensions, with all materials labeled. The sections should normally be cut through doors, windows, and other critical wall section locations. Wall sections shall not be broken. Additional details shall be included when necessary to illustrate important or unusual features. All horizontal dimensions shall occur on the plans and vertical dimensions on the sections and elevations. See paragraph on Drawing Scales for Wall Section scale requirements.

#### 1.5.1.7 Room Finish Schedules

Room finish schedule shall be complete in accordance with Corps of Engineers (COE) standard format.

#### 1.5.1.8 Furniture Placement Plan

Provide a layout showing all desk, Lockers, and furniture that will be incorporated into the design of this project.

#### 1.5.1.9 Door, Window, and Louver Schedules

Door schedule shall be complete in accordance with Corps of Engineers (COE) standard format. Schedule shall include door and frame types, except referencing to door details and hardware sets. Window and louver schedules shall be complete including window and louver types except referencing to details.

#### 1.5.1.10 Fire Ratings

Wall ratings, and fire hazards shall be clearly indicated as required by Fire Protection criteria. Wall fire ratings shall be graphically shown by a continuous symbol or poche within the wall on a Fire Protection /Life Safety Plan. When other functions coexist with the fire protection functions, their integration shall be clearly indicated, with an analysis that describes how both functions will be served. Provide a separate, floor plan which makes an accurate presentation of these various features and functions.

#### 1.5.1.11 Drawing Scales

Architectural work shall be drawn at the scales listed below. Other scales may be used only by written authorization through the Technical Manager, Omaha District. Units of measurements shown on the drawings shall be done in millimeters. All disciplines should use the same scale for plan sheets. The following is a comparison guide to establish equivalent scaling of drawings:

	<b><u>METRIC</u></b>
Composite Plans (Note 1)	Varies
Removal Plans	1:100
Floor Plans	1:100
Reflected Ceiling Plans	1:100
Detail Plans (Note 2)	1:20
Roof Plans	1:100
Exterior Elevations	Same scale as plan
Interior Elevations	1:50 min.
Interior Toilet Elevations	1:20
Building Cross Sections	1:100 or 1:50
Wall Sections (Note 3)	1:10
Stair Sections	1:20
Details (Note 2)	1:5
Wall Types	1:10
Fire Protection Plans (Note 1)	Varies

#### Notes:

1. Scale of composite plan shall be as required so that the entire facility is drawn on one sheet without break lines.
2. The goal of this requirement is that the details be large enough to show all fixtures, accessories, equipment, materials, manner of construction, clearances required for proper maintenance, and complete dimensions. Toilet rooms and Equipment rooms are examples of the kind of spaces which shall be drawn as a Detail Plan.

#### 1.5.1.12 Legends

Standard architectural material symbols used on the drawings shall be provided as a separate architectural legend drawing located just in front of the architectural drawings in the set. Additional material symbols should be added to the Legend Sheet as needed for the project.

#### 1.5.1.13 North Arrows

North arrows shall be oriented the same direction on all plan sheets and by all disciplines; including site and civil drawings. Plan north shall be "up" or the left on the drawings. Indicate true north on composite plan drawings. North arrows shall be located approximately at the same location on all sheets.

#### 1.5.1.14 Modular Design

Modular Design practices shall be followed in the design of all masonry buildings or components of buildings. Dimensions shall be figured to whole or half-unit lengths of standard units in order to reduce on-site cutting of masonry.

#### 1.5.1.15 Symbols

The Room and Door Numbering system shall be consistent. The standard symbols for Amendments (a triangular box) or Modifications (a type of circular box, see the chapter on Drafting Criteria) to the contract shall not be used for any other purpose, and care must be taken to avoid using even similar appearing but technically different symbols. Room numbering shall start at the main entrance and proceed clockwise around functional areas.

#### 1.5.1.16 Schedules

Schedules for room finish, doors, windows, louvers, etc., shall be clear and complete. As many columns as necessary should be provided in order to present the essential information. The "Remarks" column should not be used as a substitute for an information column. Normally a single item should be presented on each schedule line. Other scheduling methods as standard with the A-E may be used if approved by written authorization from the Project Architect, Omaha District.

#### 1.5.1.17 Notes

Notes may be placed on drawings to reduce the amount of repetitive drafting, provided that clarity is not lost. General notes should be placed at the right-hand edge of the sheet and, if possible, should be located on the first sheet in the set. Notes that pertain to each drawing however, should be placed on each drawing.

#### 1.5.1.18 Dimensions

Dimensions must be complete, accurate and fully coordinated. Dimensions should be to points easily measurable in the construction, and should be laid out to eliminate re figuring in the field. Dimensions should be tied-in to column lines, etc., to facilitate checking. Plan dimensions for frame construction should be to face of stud (or sheathing) for exterior walls, to one face of stud for interior partitions, and to centerline of openings. For masonry construction, dimensions should be to one or both nominal faces of masonry and to jambs of openings.

#### 1.5.1.19 Facility Elevation

The level of finished floor shall be indicated as EL.= 0000. Elevations for footings, etc., shall be related to this figure. Sea level elevations shall not be shown on the building drawings.

#### 1.5.1.20 Access to Utilities

All utilities within the building, such as piping, ductwork, electrical work, etc., shall be concealed in finished areas. Provide plumbing chases in toilet areas. The clear space above ceilings and the size of chases must be carefully figured to accommodate piping slopes and connections, ductwork crossovers, and similar situations. Access must be provided to valves, cleanouts, etc. Space provided for utilities systems must be adequate but should not be excessive.

#### 1.5.1.21 Reflected Ceiling Plans

Reflected Ceiling Plans shall be provided for all spaces in the building. Reflected ceiling plans shall show the ceiling tile layout and location of gypsum wallboard and other ceiling types where applicable. All light fixtures, air diffusers, grilles, registers, PA speakers, sprinkler head layout, smoke and heat detectors - if ceiling mounted, and other ceiling mounted items will also be shown on the reflected ceiling plans. The fixtures and other equipment shall be laid out in a regular pattern symmetrical with the ceiling tile grid, or symmetrical with the room centerlines, columns, windows, or other feature that dominates. All ceiling mounted items shown shall be fully coordinated with all other disciplines.

#### 1.5.1.22 Sketches

All sketches presented during the design phase shall be reduced to 8-1/2" by 11" and included in this design analysis to document the design options and decisions evaluated during the design process.

### 1.5.2 Technical Specifications

#### 1.5.2.1 Use of Technical Guide Specifications

Technical Guide Specifications are prepared by the Corps of Engineers to achieve the maximum uniformity in contract specifications. The technical guide specifications describe the type and quality of material and installation normally acceptable for Corps construction, and often represent specific agreement between the Corps and the applicable industry. The provisions of the technical guide specifications should not be changed without justification. The 60% submittal shall include a draft edited specifications of all the applicable sections. Items added or deleted in these specification sections shall be evident. Complete descriptions including specific size, gauge, and configuration are included in the technical Guide Specifications for a wide variety of items. The designer must be familiar with the technical Guide Specification requirements in order to provide details fully coordinated with the technical specification descriptions. Terminology used on the drawings shall be the same as used in the Technical Guide Specifications. Where it is desirable to detail a variance with the standard provisions of the Technical Guide Specifications, the specifications must be revised to coordinate with the details.

a. New Guide Specifications

New guide specifications shall be limited to those specialty type items not covered in the regular sections of Technical Guide Specifications.

1.5.3 Design Analysis Narrative

The Design Analysis shall be essentially complete with emphasis on the following:

1.5.3.1 Basic Criteria Statement

A statement indicating the basic criteria to be applied to the design including type of construction (noncombustible, etc.), category of construction (permanent, etc.), major fire protection and exit requirements, etc..

1.5.3.2 Description of Materials

A description of materials for all major building components and of all interior and exterior finishes. The description of materials must include type of exterior wall construction, room finish schedule, window types, panel materials, etc. The description of materials should follow the continuity of the Military Handbook 1190. The description of finishes may be presented in schedule form.

1.5.3.3 Additional Criteria/Clarification

A list of items on which additional criteria, clarification, or guidance is required.

1.5.3.4 Reason for Selection

The written presentation must include the designer's reasons for selecting specific materials, architectural compatibility, and architectural treatment in all cases in which the reason for selection is not obvious.

1.5.3.5 General Parameters

The design analysis shall follow the format described herein.

- a. The purposes, overall functions, and total capacities of the facility.
- b. The design theme or visual appearance of the exterior and interiors of the building, and how this facility coordinates with the image criteria of the installation on which it will be constructed.
- c. The number of personnel to use facility.
- d. The type of activities and equipment involved.
- e. The anticipated life of the functions to be accommodated.
- f. The category of construction; permanent

1.5.3.6 Functional and Technical Requirements

- a. Functional areas, occupant capacities, and allocation, including a



functional relationship matrix.

- b.** All items of equipment, required.
- c.** Occupational safety and health.
- e.** Energy conservation energy budget goals.
- f.** Sound and vibration control.
- g.** Interior service areas.
- h.** Physical security; lock and keying, intrusion-detection, alarms, restricted access areas, interior guard support, and ties to local authorities.
- i.** Justification for selection of exterior and interior finishes and materials.
- j.** Moisture Vapor Control.
- k.** Lessons learned incorporated into the design.

#### 1.5.3.7 Design Objectives and Provisions

- a.** Adaptation of the building to the size, shape, and orientation of the site.
- b.** Building layout to establish convenient circulation flows during normal operation and emergency evacuation activities, for materials, equipment, services, and people.
- c.** Grouping spaces into sound-compatible zones and protective construction zones, e.g., for fire and storm.
- d.** Space layout compatible with modular (structural and environmental) support systems.
- e.** Type of construction materials, architectural systems, and finishes.
- f.** Building expandability/changeability.
- g.** Physical security.
- i.** Energy conservation. (insulation, orientation)
- j.** Acoustical design.
- k.** Moisture vapor condensation design.
- l.** Composition of masses and spaces architectural compatibility and architectural details to reflect the design theme and desired image, and the scale and nature of the activities involved.
- m.** Perception of the building details and volumes. (Specific provisions made, e.g., an identifiable sequence of viewing positions for experiencing the interior and exterior architectural design.)
- n.** Enhancement of materials and systems maintenance and operation.

- o. Economy of building construction, operation, and maintenance: life-cycle cost effectiveness.

#### 1.5.3.8 Coordination with Installation or Outside Agencies

- a. Physical security support.
- b. Occupational safety and health, as required.
- c. Government furnished equipment.
- d. Operations and maintenance support.

#### 1.5.3.9 Checklists

Fire Protection Code Analysis shall be included in the Design Analysis. See attachments No. 1 and No. 2 at the end of this section.

#### 1.5.4 Design Analysis Calculations

- a. Net room areas, occupant capacity and gross building areas.

(Categorize areas and capacities under the titles of "Operational Space Requirements", "Administrative Space Requirements", "Storage Space Requirements", and "Support Space Requirements".)

- b. U-values for each wall, window, door, or roof type studied or selected.
- c. Acoustics.
- d. Rainfall intensity relative to roof area and roof drain size and number calculations.

#### 1.5.5 Requirements for Submittal for SHPO Approval

At 60% the design the GATR building and antennas need to be submitted for approved by the State Historical Preservation Office (SHPO. Drawings or perspectives looking toward the GATA building and it's antennas from Interstate 25 need to be provided.

### 1.6 INTERIORS

#### 1.6.1 DESIGN ANALYSIS/NARRATIVE

The design analysis shall contain an explanation of the desired image or visual appearance of the interior of the facility and the design intent.

#### 1.6.2 TECHNICAL SPECIFICATIONS

Appropriate UFGS guide specifications shall be provided and coordinated with the drawings and design analysis. Specifications shall be edited to identify proposed product and installation requirements. Use SECTION 09915 Color Schedule to specify exterior and interior finish colors. Where materials or installation requirements are not covered in the provided

specifications, information shall be prepared to cover these items. In addition to guidance provided in SECTION 01332 on editing technical specifications, data and sample submittals for all interior and exterior finishes (including but not limited to interior design and architectural specifications) shall be "G AE" submittals.

#### 1.6.3 COLOR BOARDS AND LEGENDS

Color boards shall show actual color samples of all proposed exterior and interior finishes. A color board legend shall accompany the boards and shall clearly identify all finishes. Clarification of finish placement shall be required when more than one color of a single finish is proposed. Color boards shall be 8 1/2" x 11" in size and provided in a three ring binder. Include project name and location, design stage and date on the front cover and spine of the binder.

#### 1.6.4 FURNITURE FOOTPRINT

Furniture footprint shall include all furniture and equipment in the project. Identify GF/GI furniture and equipment as not in contract. Drawings shall be done at same scale as architectural area sheets.

#### 1.6.5 FURNITURE PACKAGE

Submittal requirements shall comply with the 65% submittal requirements of the Air Force Center for Environmental Excellence (AFCEE) Interior Design Presentation Format for Comprehensive Interior Design (CID). Requirements for Interior Color Rendering, Black and White Sketch Perspective and Manufacturer's Summary Lists are not required for this project. Furniture systems drawings shall include elevations, not isometrics. An item code legend shall also be provided. The legend shall list all furniture items by code and name.

### 1.7 STRUCTURAL

#### 1.7.1 DRAWINGS

Drawings shall include roof framing plans, floor slab plans and foundation plans for buildings. Roof framing plans shall show sufficient details to clearly indicate the type of framing system used, size and spacing of members and their elevations. The location of all columns or pilasters shall be shown, and all building structural members shall be at least outlined. The sizes, locations and elevations of footings shall be shown. Slab plans shall be coordinated with the Architectural sheets and shall indicate the locations of structural walls and masonry partitions, recessed slabs and contraction or construction joints. Concrete slab-on-grade thicknesses and sections shall be shown. Proposed treatment of unique or complex features and details shall be shown on the drawings. Elevation views, sections and details necessary to illustrate the design at a 60% level of completion shall be provided. Drawings shall also include overall building plan dimensions, north arrows, and design notes. Drawings shall be done at a scale appropriate for the design, in no case however, shall plan type drawings be done at a scale smaller than 1:100 or detail type drawings at a scale smaller than 1:20.

#### 1.7.2 SPECIFICATIONS

For this 60% design submittal the Contractor shall provide a listing by

title and number of all Technical Specifications proposed for use in the final structural design.

#### 1.7.3 DESIGN ANALYSIS NARRATIVE

Design analysis shall follow the format described in Section 01332 SUBMITTALS DURING DESIGN, Paragraph 3.3, "Design Analyses" and the specific content shall be essentially as outlined below.

##### 1.7.3.1 Design Criteria and References

A list of design criteria references, such as Department of the Air Force Manuals, Army Corps of Engineers Technical Instructions, ACI Standards, AISC Specifications, etc., and any other references which were used in the design of the project shall be included in the narrative.

##### 1.7.3.2 Design Loads and Conditions

A list of structural design loads and conditions shall be provided, including:

- Snow load parameters;
- Wind load parameters
- Seismic design parameters;
- Roof live loads;
- Floor live loads, identifying each loading with usage and the room or space where used, including vibration loads;
- Foundation design criteria, including the design depth for footings, pier end-bearing and side friction allowable loads, allowable soil bearing pressure, equivalent fluid densities (or lateral earth pressure coefficients) for the design of earth retaining structures and building components, modulus of subgrade reaction, and any other pertinent data derived from the recommendations of the Final Foundation Analysis report (See Attachment #1 included as an appendix to this solicitation), a copy of which shall be included as an Appendix to the design analysis.

##### 1.7.3.3 Structural Materials

A list of structural materials shall be provided, together with the stress grades and/or ASTM designations, as applicable, for structural steel, concrete, and reinforcing steel; the series for steel joists; and identification of the proposed use of each material in the structure.

##### 1.7.3.4 Availability of Precast Concrete Units

Where precast concrete units of particular cross section(s) and concrete strength are a part of the structural design, verification of their availability from precast producers in the project vicinity shall be documented. Acceptable documentation consists of letters from the producers or a written statement by the Contractor identifying the name and address of the precast manufacturer(s), description of units and concrete strength(s) available, date when availability was verified, and name of Contractor's staff member who obtained the verification.

##### 1.7.3.5 Description of the Structural System

A concise description of the proposed structural systems selected for the building, together with the reasons for its selection, shall be provided.

All principal elements of the structural system selected shall be described. Typically, these shall include:

- Primary supporting members for the roof;
- Masonry walls, type of material, and whether load bearing or non-load bearing, with location of load-bearing walls defined, and measures taken to compensate for expansion/contraction and crack control in masonry walls;
- The proposed system for resisting lateral forces (wind and earthquake) and transferring them to the ground, whether diaphragms, chord bracing, shear walls, braced or moment resisting frame, etc;
- Foundations, description of special designs to accommodate existing site conditions;
- Concrete slab-on-grade floors, description of floor surface finish treatment, accommodation of live loads, and the use, location and types of crack control joints;
- The proposed treatment of any unusual structural loadings, features or unique solutions to structural problems .
- Identification of any major vibrating elements and measures taken to isolate them.

#### 1.7.4 DESIGN ANALYSIS CALCULATIONS

The extent of the structural calculations shall be indicative of a design which has reached a 60% level of completion. Computations shall include the determination of snow, wind, seismic, dead and live loads. Computations shall show sizing and spacing of structural members for roof framing, sidewalls and foundation sizes, as appropriate to the systems to be used for these elements.

#### 1.8 MECHANICAL

Compliance with the design requirements for the building mechanical systems will be determined by a review of the submitted 60 percent drawings, design analysis, calculations, energy analysis, any life cycle cost analysis required and specifications. Any conflicts in the design requirements or lack of thorough understanding of the nature and scope of work shall be identified and resolved prior to submittal of the 60 percent design.

##### 1.8.1 DESIGN DRAWINGS

The 60 percent design drawings shall be fully coordinated with the design

analysis. Provide sufficient plans, piping diagrams, sections, air & water flow diagrams, mechanical room layouts, details, schedules, and control diagrams/sequences of operation etc. shall be provided as necessary to define the required design intent. Floor plans shall use the architectural floor plans as a basis, with the building outline half-toned. Coordinate with architecture design for provisions of access panels for all concealed valves, traps, fire dampers and air vents etc.. Coordinate with architectural design so that louvers shown on architectural drawings match damper sizes for the respective openings as shown on Mechanical drawings. Unless otherwise indicated, all floor plans shall be drawn at 1:100 scale and show all room names and numbers. An exception to this are administrative areas being air-conditioned shall be 1:50 scale and mechanical room plans shall be 1:20 scale. Sheet reference number sequencing shall be in accordance with the Omaha District CADD Standards Manual. Submittal drawings shall include, but not limited to, the following:

#### 1.8.1.1 Mechanical Index Sheet

An index sheet identifying all mechanical drawings shall be provided, including those drawings anticipated to be provided in the 100 percent design submittal. Index shall include drawing design file numbers, drawing numbers, sheet numbers, and drawing descriptions.

#### 1.8.1.2 Mechanical Abbreviation, Legend, and General Notes Sheet

This sheet shall include all mechanical abbreviations and symbols that will be used on the drawings. Symbols shall be grouped into sections; as a minimum, provide sections for Plumbing, Heating, Miscellaneous Piping, Valves and Fittings, and ventilation including a separate sheet for HVAC controls legend.

#### 1.8.1.3 Exterior Utility Drawings

The following exterior utility drawings shall be provided:

##### a. Removal Plan

All existing exterior mechanical utilities and utilities which are to be removed shall be indicated on the Site Removal Plan located in the civil section of the drawing package.

##### b. Utility Plan:

All existing and new mechanical utilities shall be indicated on the Site Composite Utilities Plan located in the civil section of the drawing package. The location of existing exterior utilities shall be thoroughly checked and indicated on plans and profiles, thus preventing interference with new services. The utility drawing shall indicate all new utilities, including tie-in points, isolation valves and existing utilities which have or are to be abandoned.

#### 1.8.1.4 Plumbing Drawings

The following plumbing drawings shall be provided:

##### a. Plumbing Plans

Plumbing plans showing the design and tentative layout of the domestic hot

and cold water distribution systems; make-up water piping; soil, waste and vent piping; and storm water drainage system shall be provided. Plans shall show all anticipated routing of piping systems from the connections within the structure to a point 1.5 meters outside the structure. The grade of all drain lines shall be calculated and invert elevations established. All electrical panels/equipment and pertinent HVAC equipment (expansion tanks, boilers, AHU's, pumps, lawn sprinkler system, etc.) shall be outlined in half-tone on the plumbing plans. Plans may combine building areas and be drawn at 1:100 scale as long as legibility is not compromised.

Plumbing fixtures and drains shown on the drawings shall be designated by the same identification system used in the Technical Specification and Plumbing Fixture Schedule.

b. Enlarged Mechanical Room Plumbing Plan

An enlarged mechanical room plumbing plan drawn at a minimum 1:50 scale shall be provided. Plan shall show layout of all plumbing equipment and piping within the rooms. In addition to all the plumbing systems required, the plan shall show half-toned outlines of all HVAC equipment located in the room, gas service, including meter/regulator assembly, lawn sprinkler apparatus, the fire protection entrance and risers, and the outline of any electrical panels or equipment located in the room.

c. Plumbing Detail and Schedule Sheet

The following details shall be provided: water heaters, and water service entrance. The provided plumbing fixture schedule and a contractor generated water heater schedule shall be provided.

d. Enlarged Toilet Room Plans

Enlarged toilet room plans showing all fixtures, water, waste, and vent piping shall be provided for each toilet area. Enlarged plans shall be drawn at a minimum 1:50 scale. Also, separate riser diagrams shall be provided for each toilet area.

1.8.1.5 Mechanical HVAC Drawings

Show on mechanical HVAC drawings, all items of mechanical equipment, including boiler room equipment, HVAC equipment layout, air handling units, air distribution and exhaust systems, etc., to determine proper space allocation within the intent of the architectural layout requirements. Plans, elevations, and sections shall be developed sufficiently to insure that major equipment items, piping, and ductwork cause no interference with structural members, electrical equipment, etc. The following HVAC drawings shall be provided:

a. Mechanical HVAC Plans

Mechanical HVAC plans showing the design and tentative layout of the hot water piping distribution system, chilled water piping distribution system and equipment, the air supply and distribution systems, and the ventilation and exhaust systems shall be provided. Air supply and distribution systems shall show all ductwork, including supply and return ductwork, ductwork to diffusers, and all diffusers. For the 60 percent submittal, all ductwork may be shown as single-lined. The final design submittal shall show all ductwork as double-lined. All electrical panels/equipment and pertinent plumbing equipment shall be outlined in half-tone on the HVAC plans.

b. Enlarged Mechanical Room HVAC Plans

Enlarged mechanical room HVAC plans showing all mechanical systems and drawn at a minimum 1:50 scale shall be provided. Plans shall show layout of all equipment, AHU'S piping, and ducts located within the rooms. Equipment shall include (but not limited to) air handling units with associated outside air intakes, relief air, and supply/return ducts; exhaust/supply fans, mechanical room ventilation intake/relief openings, gas service entrance, combustion air opening, unit heaters, HW pumps, CW pumps, boilers, chillers, dry coolers, condensing units, air separators, expansion tanks, water treatment, variable frequency drives and temperature control panels. Openings for relief air and outside air shall be coordinated with size of architectural louver. Plans shall show dedicated access space for items requiring maintenance to include tube pull space for boilers and heat exchangers. In addition to all the mechanical HVAC systems required, the plan shall show half-toned outlines of all major plumbing equipment, the water service entrance, fire protection entrance and riser, lawn sprinkler apparatus, and any electrical equipment or panels located in the room.

c. Mechanical Room Sections:

For each air handling unit within the mechanical room, a mechanical room section view shall be provided showing, but not limited to, all AHU components, ductwork connections/routing, and relationship to adjacent structural features.

d. Hot Water & Chilled Water System Flow Diagram:

Provide flow diagram showing the facility piping system including the pumps and connected hot water & chilled water equipment. Each pump and equipment item shall show associated flow rate. All thermometers, pressure gauges, isolation and control valves, bypass piping, freeze protection piping, etc. shall be shown on the flow diagram. Coordinate heating and chilled water flow with control valves so that adequate three-way valves are provided to insure minimum flow rates through boiler and chiller at low building load demands.

e. Mechanical Detail Sheets:

Installation details showing all specification requirements such as isolation and balancing valves, thermometers, pressure gauges, equipment pads, strainers, vents, hangers, vibration isolation, etc. shall be provided for each item of mechanical equipment. As a minimum, the following mechanical details shall be provided to the extent they are included in the design:

- Refrigerant Piping Diagrams
- Hot Water Boilers and Piping Diagram
- Chilled water piping Diagrams
- Chilled water pumps
- Hot Water Pumps
- Hot water coil piping
- Chilled water coil piping
- Expansion Tanks
- Horizontal Unit Heaters
- Vertical Unit Heaters
- Chemical Shot Feeders
- Gas Service Entrances



Cabinet Unit Heaters  
Air Handling Units  
Wall Propeller Supply/Exhaust Fans  
In-line Supply/Exhaust Fans  
Relief Hoods  
Relief Vents  
Exhaust Hoods

f. Mechanical Schedule Sheets

Schedules, with preliminary capacities, shall be provided for each item of mechanical equipment. Furnished typical equipment schedules shall be used whenever possible and shall be revised and completed as necessary to suit the project requirements. In addition to the furnished schedules, damper and control valve schedules shall also be provided at Final submittal.

1.8.1.6 HVAC Control Drawings

Simplified, one-line type control schematics showing all control system interface points and detailed sequence of operation shall be provided for all mechanical equipment and systems. Sequence of operation for each item of equipment and system shall be sub-sectioned into paragraphs describing discreet operational requirements. See section 1006 for specific DDC HVAC control system drawing requirements. The following drawings shall be provided:

HVAC Controls Legend:

This sheet shall include all control abbreviations and symbols that will be used on the HVAC control drawings. Furnished Controls Legend sheet shall be used as a basis for all abbreviations and symbols used on the Final Control Drawings.

a. Miscellaneous Systems

These sheets shall include all miscellaneous equipment items such as supply/exhaust fans, unit heaters, radiant floor heating, infra-red heaters, controls, air compressors, etc. that are not interlocked to the main HW, CW or air handling unit systems. Provide control schematic and sequence of control for each item of equipment and system on the same sheet.

b. Hot Water System

Provide a boiler and pumping system control schematic and sequence of operation.

c. Not Used

d. Air Conditioning System:

Provide a condensing unit, evaporator and chilled water pumping system control schematic and sequence of operation. Include all items of equipment that are interlocked to each system.

e. Air Handling Systems

For each air handling system, including outside air makeup system, provide a control schematic and a sequence of operation. Include all items of equipment that are interlocked to each system.

f. Control Points Lists

Provide Local Control Panel control points lists for all items of equipment and systems, for each AHU, HW, or CW system identifying all anticipated temperature control system input/output points. The format for defining the input/output points shall be as identified on the furnished Example Control Point List sheets and as defined in section 1006.

1.8.2 TECHNICAL SPECIFICATIONS

UFGS specifications shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product and installation requirements for the facility. The provided specifications define the minimum requirements for items of equipment, materials, installation, training, operating and maintenance instructions, O&M manuals and testing that shall be provided for the facility. Where items of equipment, materials, installation, training, operating and maintenance instructions, O&M manuals or testing requirements are not covered in the provided specifications, special Sections within each guide specification(s) shall be prepared to cover those subjects. Specific items of equipment identified in the provided specifications but not required for the facility shall be edited out. Government approval is required for any specification addition or deletion.

The following UFGS guide specifications shall be edited and coordinated with the drawings and design analysis to identify the proposed product and installation requirements for the facility:

02556A	Gas Distribution System
13080A	SEISMIC PROTECTION FOR MISCELLANEOUS EQUIPMENT
15070A	Seismic Protection for Mechanical Equipment
15080A	Thermal Insulation for Mechanical Systems
15181A	Chilled and Condenser Water Piping and Accessories
15400A	Plumbing, General Purpose
15190A	Gas Piping Systems
15569A	Water and Steam Heating; Oil, Gas or Both; up to 20 MBTUH
15620A	Liquid Chillers
15895A	Air-Supply, Distribution, Ventilation, and Exhaust System
15951	Direct Digital Control For HVAC
15990A	Testing, Adjusting and Balancing of HVAC Systems
15995A	Commissioning For HVAC Systems

1.8.3 DESIGN ANALYSIS NARRATIVE

The narrative portion of the design analysis shall contain a narrative description and analysis for each of the mechanical portions of the design.

The basis and reasons for specific engineering decisions, special features, unusual requirements, etc., shall be explained or summarized as applicable. If it is necessary to deviate from criteria or standard practice, reasons shall also be included. Design statements shall be provided in sufficient detail to enable the reviewer to get a clear picture and understanding of all included work so that approval will be granted. Narrative shall be complete relative to scope and intended design approaches. The total scope projected to final design shall be outlined in a form that will be conveniently adapted, expanded, and detailed at the final design stage. If alternatives were to be evaluated and selected by the designer, findings (pros and cons) and conclusions shall be included.

The design analysis shall carry a complete narrative (including Energy Budget Analysis) for every item and system covered in the design, and shall include, but not be limited to, the following:

U-values for each wall, window, door, or roof type selected.

#### 1.8.3.1 Index

Provide a design analysis index identifying all main and sub-paragraph headings.

#### 1.8.3.2 Project Summary

Provide a brief description of the mechanical design objectives.

#### 1.8.3.3 Applicable Criteria

A list of all applicable criteria used for basis of design.

#### 1.8.3.4 Technical Specifications

Edited Technical Guide Specifications that will be used for the project.

#### 1.8.3.5 Design Conditions

A list of Mechanical HVAC design conditions including elevation, latitude, heating/cooling degree days, winter and summer outside design temperatures, inside design temperatures for all spaces, ventilation rates, etc. shall be provided.

#### 1.8.3.6 System Descriptions

Provide a complete description of all building systems; include the designer's reasons for selecting specific materials, systems, etc. in which the reason for selection is not obvious. System descriptions shall be include, but not limited to, the following:

- Plumbing Systems
- Exterior Gas Distribution System
- Interior Gas Piping Systems
- Hot Water Heating Systems
- Exhaust Hoods
- Air Supply and Distribution Systems
- Ventilation and Exhaust Systems
- Temperature Control Systems
- Seismic Protection
- Chilled Water Systems
- Refrigeration Systems

#### 1.8.4 DESIGN ANALYSIS CALCULATIONS

The Design Analysis calculations shall provide an estimate of the heating, cooling, and ventilation loads to determine a preliminary selection of the type and size of mechanical equipment to be used. Design calculations shall be provided in sufficient detail to enable the reviewer to get a clear understanding of all work to allow approval. Backup data shall be furnished to support basic design decisions related to sizing of major equipment and materials, performance of specific systems or equipment. Manufacturer's catalog data sheets shall be provided for each item of

equipment selected. Calculations may be performed by manual or computerized procedures. Use of standardized charts, curves, tables, graphs will generally be acceptable for portions of required calculations lieu of specific calculation procedures. Such data must be from a recognized source which is identified in the design analysis and shall be included with the calculations. Design calculations and computations shall be provided for all systems and shall include, but not limited to, the following:

1.8.4.1 Index

Provide a design analysis index identifying all calculation items.

1.8.4.2 Design Conditions

A list of Mechanical HVAC design conditions including elevation, latitude, heating/cooling degree days, winter and summer outside design temperatures, inside design temperatures for all spaces, ventilation rates, etc. shall be provided.

1.8.4.3 Zone Air-Conditioning Loads

Preliminary cooling calculations shall be prepared using the Cooling Load Temperature Differential/Cooling Load Factors (CLTD/CLF) Method as described in the ASHRAE Handbook Fundamentals.

1.8.4.4 Block Air-Conditioning Loads

Preliminary cooling calculations shall be prepared using the Cooling Load Temperature Differential/Cooling Load Factors (CLTD/CLF) Method as described in the ASHRAE Handbook Fundamentals including any growth factor indicated in section 1006.

1.8.4.5 Chilled Water Pump Selections

Include pump flow calculations and catalog selection data indicating dimensions, connection sizes, rpm, horsepower, and efficiency.

1.8.4.6 Heating Loads

Preliminary block heating load calculations, including a 15 % piping losses allowance.

1.8.4.7 Heating Load Summary

A tabular summary of all heating load calculations for each area or room, including combustion air heating, shall be provided.

1.8.4.8 Boiler Selection

Include boiler capacity adjustments for altitude, inefficiency, and net rating. Provide catalog data indicating input capacity, net output capacity, dimensions, and water and flue size connections. If a high efficiency condensing type boiler(s) is proposed, insure the heating coils in all equipment are sized (larger) to take into account the lower return water temperature upon which these boilers are normally selected.

1.8.4.9 Hot Water Pump Selection

Include pump flow calculations and catalog selection data indicating dimensions, connection sizes, rpm, horsepower, and efficiency.

#### 1.8.4.10 Combustion-Air Requirements

Include combustion air quantity and free area calculations, louver selection, combustion air heating requirements, and selection of heating equipment.

#### 1.8.4.11 Unit Heater Selections

For each area requiring a unit heater, provide data on capacity, weight, and horsepower.

#### 1.8.4.12 Mechanical Ventilation

For each area or room requiring mechanical ventilation for cooling; provide calculations similar to zone air-conditioning, louver selection, and additional calculations to be provided are:

External static pressure calculations for all fans  
Control damper Cv calculations at Final submittal  
Catalog Fan data

#### 1.8.4.13 Toilets/Janitor Room Ventilation

Provide calculations, catalog fan data, and louver selections, for each toilet area.

#### 1.8.4.14 Air Handling Units

A tabular summary of all airflow calculations for each area or room shall be provided on each air distribution system for fan sizing. Additional calculations to be provided are:

External static pressure calculations for all fans  
Control damper Cv calculations at Final submittal  
Catalog Fan data

#### 1.8.4.15 Domestic Water Demand

Calculations for determining the size of the domestic cold water supply line to the building shall be provided.

#### 1.8.4.16 Domestic Hot Water Demand

The design guidance provided for service water heating in ASHRAE Handbook HVAC Systems and Applications shall be followed to determine the domestic hot water demand for the facility. Provide catalog data for the domestic water heaters.

#### 1.8.4.17 Electrical Load Summary

A summary of all mechanical equipment and the associated electrical load requirements shall be provided.

#### 1.8.4.18 Additional calculations

Additional calculations to be provided are:

pipe sizing calculations for the CW & HW, & gas piping systems  
CW & HW pump head calculations  
CW & HW expansion tank sizing  
Control valve Cv calculations at Final submittal

#### 1.8.5 ENERGY CONSERVATION

Mechanical designs shall be economical, maintainable and energy conservative and solar water preheating systems with full consideration given to the functional requirements and planned life of the facility. Emphasis shall be given to heat reclamation, outside air usage and other energy conservation measures for mechanical systems. Each major item of proposed mechanical equipment shall have a net efficiency rating that is equal to or exceeds the net efficiency ratings of similar or equal equipment of the four manufacturers each having one of the four highest ratings that meets the design criteria.

#### 1.8.6 AIR POLLUTION CONTROL

Air pollution control shall be incorporated in all designs. The Architect-Engineer shall investigate the latest Using Service, Local, State, and Federal regulations and standards, analyze and report on requirements in the design analysis, and include in the design as applicable. The most stringent of all regulations and standards shall be implemented into the design. If in doubt as to requirements, contact this office for assistance.

#### 1.8.7 Energy Analysis Narrative

The narrative portion of the energy analysis shall contain a narrative description and analysis for each of the mechanical portions of the design used to simulate the building systems. Energy analysis shall not be limited to mechanical systems, but, shall include building envelope, glazing, shading, electrical systems, as indicated in paragraph ENERGY BUDGET COMPLIANCE (EUB) CHECK in Section 01006. The basis and reasons for specific engineering decisions, special features, unusual requirements, etc., shall be explained or summarized as applicable. If it is necessary to deviate from criteria or standard practice, reasons shall also be included. The total scope projected to final design shall be outlined in a form that will be conveniently adapted, expanded, and detailed at the final design stage. If alternatives were to be evaluated and selected by the designer, findings (pros and cons) and conclusions shall be included. The design analysis shall carry a complete narrative (including Energy Budget Analysis) for every item and system covered in the design, see section 1006 paragraph ENERGY BUDGET COMPLIANCE (EUB) CHECK and shall include, but not be limited to, the following:

a. Index

Provide a mechanical energy analysis index identifying all main and sub-paragraph headings.

b. Project Summary

Provide a brief description of the mechanical design systems simulated.

c. Applicable Criteria

A list of all applicable criteria used for basis of design.

d. Design Conditions

A list of Mechanical HVAC design conditions including elevation, latitude, heating/cooling degree days, winter and summer outside design temperatures, inside design temperatures for all spaces, ventilation rates, etc. shall be provided.

1.8.8 Life Cycle Cost Analysis (LCCA) (Where Required)

The narrative portion of the life cycle cost analysis shall contain a narrative description and analysis for each of the mechanical portions of the design used required to be compared for LCCA including but not limited to mechanical systems, shading, glazing, lighting, and other features of the building. The basis and reasons for specific engineering decisions, special features, unusual requirements, etc., shall be explained or summarized as applicable. If it is necessary to deviate from criteria or standard practice, reasons shall also be included. The total scope projected to final design shall be outlined in a form that will be conveniently adapted, expanded, and detailed at the final design stage. If alternatives were to be evaluated and selected by the designer, findings (pros and cons) and conclusions shall be included. The design analysis shall carry a complete narrative (including LCCA analysis) for every item and system required, see section 01006 paragraph and shall include, but not be limited to, the following:

a. Index

Provide a life cycle cost analysis index identifying all main and sub-paragraph headings.

b. Project Summary

Provide a brief description of the mechanical design LCCA systems required.

c. Applicable Criteria

A list of all applicable criteria used for basis of design.

1.9 ELECTRICAL

1.9.1 Drawings

Drawing scale shall match architectural drawing requirements. Drawings shall show the following:

1.9.1.1 Lighting Layout and List of Fixtures

Complete lighting layout of all areas shall be provided. The type of fixture shall be indicated on the drawing. Complete list of fixtures proposed with type of lamp and wattage.

1.9.1.2 Receptacle Layout

Complete receptacle layout should be provided for all areas to indicate project requirements.

1.9.1.3 Power Equipment and Layout

Power equipment and layout such as switchgear, panelboards, large motor driven items, etc.

#### 1.9.1.4 Power One Line Diagram

Power one line diagram shall be shown to indicate arrangement of the system.

#### 1.9.1.5 Communications

Communications (telephone, public address) shall be shown sufficiently to indicate the designers understanding of the Section 01007 ELECTRICAL REQUIREMENTS.

#### 1.9.1.6 Fire Detection

Fire Detection drawings shall be provided and inserted in the Fire Protection/Fire Suppression F-Series of drawings.

#### 1.9.1.7 Miscellaneous Details of Special Equipment

Miscellaneous details of special equipment to indicate understanding of 01007 ELECTRICAL REQUIREMENTS.

#### 1.9.2 Specifications

Submit prescriptive specification sections to specify the quality, characteristics, installation procedures and testing requirements for all items of the proposed electrical design.

Specifications shall be provided (to approximately 60 percent completion).

See Section 01332 SUBMITTALS DURING DESIGN, paragraph 3.2, SPECIFICATIONS for additional requirements.

#### 1.9.3 Design Analysis Narrative

The design analysis shall contain a description and analysis of the electrical portions of the design. Special features, unusual requirements, etc., should be noted. Narrative must address all technical requirements identified in Section 01007 ELECTRICAL REQUIREMENTS.

#### 1.9.4 Design Analysis Calculations

Backup data shall be furnished to support basic design decisions related to sizing of major equipment and materials. As a minimum the following shall be submitted.

##### 1.9.4.1 Service

Sizing of building services EMD (Estimated Maximum Demand) for all the building loads.

##### 1.9.4.2 Transformers

Sizing of general purpose dry type transformers.

##### 1.9.4.3 Feeders

Sizing of main feeders.



#### 1.9.4.4 Panelboards

Sizing of panelboards and distribution equipment.

#### 1.9.4.5 Illumination Calculations

Data should identify target and calculated illumination levels for all typical rooms. Calculations should be adjusted to compensate for special applications such as irregularly shaped rooms, open sides, ceiling obstructions (beams, ductwork), corridors, etc. If the lumen method is used for corridor calculations, the calculations should be performed using a module in which the length does not exceed 3 times the width (2:1 ratio preferred).

Computations shall be based on the simple lumen method using coefficients of utilization corresponding to 80 percent ceiling and 50 percent wall reflectance factors in office type applications (white suspended ceilings and light colored unobstructed walls). The floor coefficient of utilization factor shall be 20 percent for most areas with dark carpeting or tile. Lower levels shall be used such as 50 percent/30 percent factors for applications with CMU walls, dark colors, irregular surfaces and/or structural obstructions. A maintenance factor of 0.7 shall be used for the typical application (this value shall be adjusted for non-typical applications - 0.75 or 0.8 for a well maintained office or lab with a filtered air supply, 0.65 for a mechanical room with minimal maintenance).

#### 1.9.4.6 Short Circuit Evaluation

The maximum possible fault current at the building service should be calculated. Infinite bus shall be used for determining the maximum available fault..

#### 1.9.4.7 Voltage Drop Determination

Provide voltage drop calculations in accordance with IEEE 241 to demonstrate that the voltage drop recommendations of NFPA 70 are satisfied.

Calculations must be in accordance with the NEC and applicable IEEE guidelines. The following or equivalent formula should be used  $V_d = I(R \cos Q + j \sin Q)$ . Interpolation and projection techniques may be used (i.e., a calculation for a 120 foot feeder to a 225A panel would not be necessary if a calculation for a 130 foot feeder to a 225A panel had already been performed). Calculations must be sufficient to encompass the application range of the project.

Distribution system design for voltages over 600 volts shall be based on a maximum of 2% voltage drop.

Distribution, feeders and branch circuit system design shall be based on a maximum of 5% voltage drop from the transformer to the utilization equipment. This shall be split such that there will be 2% or less voltage drop from the transformer (service drop, service entrance, etc.) to the branch circuit panelboard (proportioned most economically between the service and feeder conductors) and 3% voltage drop or more on branch circuits.

#### 1.9.4.8 Estimated Mean Demand (EMD)

EMD shall be calculated in accordance with NEC Article 220 for demand factors, in accordance with the direction below and in accordance with the NEC for design factors. Design factors are factors in the code such as continuous loads use 1.25 times the load and largest motor is times 1.25. EMD equals connected load times demand factor times design factor.

- a. Incandescent Light Fixtures. Connected load shall be the sum of the lamp wattages. Use a demand factor of 80% to 100%.
- b. HID and Fluorescent Light Fixtures. Connected load shall be the sum of lamp wattages and the ballast loss factors. Use a demand factor of 80% to 100%.
- c. General use receptacles. Connected load shall be 180 VA for each receptacle with a maximum of six receptacles. Use demand factors per NEC Table 220-13.
- d. Dedicated or Special equipment receptacles. Connected load shall be the nameplate rating of the equipment or it shall be the receptacle rating. Demand factor shall be 75% to 100%.
- e. Fixed equipment. Connected load shall be the nameplate rating. Demand factor shall be 75% to 100%.
- f. Electric kitchen equipment. Connected load shall be the nameplate rating. Demand factors shall comply with NEC Article 220.
- g. Motors. Connected load shall be the nameplate rating. Demand factor shall be 80% to 100% and shall comply with Article 220.
- h. Spares. Equipment such as transformers, panelboards, switchgear, switchboards, and motor control centers shall have 25% spare capacity.

#### 1.10 FIRE PROTECTION

##### 1.10.1 DRAWINGS

Features of Fire Protection, their ratings, and the hazards requiring them, shall be clearly indicated. Sprinkler and fire alarm/detection areas shall also be clearly indicated. Fire detection and sprinkler systems shall be detailed sufficiently to indicate the designers understanding of the Section 01008 FIRE PROTECTION REQUIREMENTS. When other functions co-exist with the fire protection functions, their integration shall be clearly indicated, with an analysis that describes how both functions will be served. Provide a separate, composite type floor plan which makes an accurate presentation of these various features and functions. As part of the submittal, provide a set of plans that shows emergency egress for the facility.

##### 1.10.2 DESIGN ANALYSIS

The design analysis shall include a separate fire protection report containing, but not limited to, review statements and/or comments on the following items, where applicable.

- a. Location and rating of fire walls and fire partitions.
- b. Column, floor, and roof protection.
- c. Path of travel for emergency egress and operation of panic exits.
- d. Access to building for fire fighting.
- e. Design and placement of fire and smoke stop doors.
- f. Labeled windows, where required.

- g.** Venting of smoke.
- h.** Placement of hand fire extinguisher cabinets.
- i.** Type and adequacy of sprinkler system.
- j.** Building exterior fire protection facilities and building clearances.
- k.** Type of occupancy.
- l.** Zoning of fixed fire protection systems.
- m.** Type and adequacy of fire alarm and detection systems.
- n.** Zoning of fire alarm and detection systems.
- o.** Number of zones of alarm and detection systems that are separately transmitted to the base or installation fire department.
- p.** Type of Construction.
- q.** Height and area limitation.
- r.** Flame-spread and smoke-developed ratings.
- s.** Water supplies for fire protection.

#### 1.10.3 TECHNICAL GUIDE SPECIFICATIONS

None of the government provided guide specifications are required to be submitted at this design stage. However; any Contractor generated specifications required to meet the project specifics, or individual specification items added to the provided guide specifications shall be submitted for review. Note that guide specifications 13930, WET PIPE SPRINKLER SYSTEMS, FIRE PROTECTION and 13851, FIRE DETECTION AND ALARM SYSTEM, ADDRESSABLE are a part of this contract. As such they may be edited only for those portions that do not apply to this project. Note that this applies only to equipment items. Testing, qualifications, submittal requirements, etc., may not be modified or deleted. For the equipment items that do apply, no changes may be made.

#### 1.11 ENVIRONMENTAL PROTECTION, COMPLIANCE, AND PERMITS

##### 1.11.1 General Requirements

Specification Section 01355, ENVIRONMENTAL PROTECTION, furnished with Division 1 of this RFP, contains requirements presently known to be required for environmental protection, compliance, and permits on this project. It is the Contractor's responsibility to provide any additional requirements to ensure that the project is in full environmental compliance with Federal, State, and local laws and regulations. The Contractor shall include any additional requirements in the 60% Environmental Protection, Compliance, and Permits Design Analysis Chapter and the Environmental Protection Plan for the project.

##### 1.11.2 Design Analysis Chapter

The Contractor shall prepare a chapter in the Design Analysis entitled:

"ENVIRONMENTAL PROTECTION, COMPLIANCE, AND PERMITS". This chapter shall include a summary of environmental coordination, compliance, approvals, permits, and etc. required for the project. The Contractor shall include documentations of the persons contacted along with phone numbers, summary of coordination, discussions, phone conversation records, and/or letters required to assure that the project is in full compliance with all Federal, State, and local environmental laws and regulations. A list of environmental permits, approvals, notifications, etc. that are required for the project shall be included.

1.11.3 Draft Environmental Protection Plan

The Contractor shall prepare and submit a Draft Environmental Protection Plan in accordance with the requirements of Section 01355 ENVIRONMENTAL PROTECTION. If additional environmental compliance plans are identified during the design, the Contractor shall include the additional plans.

1.11.4 Appendix to the Environmental Protection Plan

As an Appendix to the Draft Environmental Protection Plan, the Contractor shall submit copies of the permit applications and associated documents, notices, reviews, and/or approvals that are required for the project. If at 60% Design any permits or approvals have been received, copies of the permits and/or approvals shall be included.

PART 2 NOT USED

PART 3 NOT USED

-- End of Section --

**PART 3 - CODE ANALYSIS**  
**UNIFORM BUILDING CODE (UBC) AND NFPA "LIFE SAFETY CODE" ANALYSIS**

LIFE SAFETY AND FIRE PROTECTION IS AN INTEGRAL PART OF EVERY FACILITY DESIGN. RECOGNIZED CODES AND ACCEPTED SAFETY STANDARDS SHALL BE FOLLOWED IN THE DESIGN OF ALL FACILITIES. OF THE VARIOUS CODES AND SAFETY STANDARDS THE NATIONAL FIRE PROTECTION ASSOC. (NFPA) "LIFE SAFETY CODE" SHALL TAKE PRECEDENCE. ALL APPLICABLE REQUIREMENTS OF THE LIFE SAFETY CODE SHALL BE INCORPORATED INTO EACH DESIGN. FOR TYPE OF CONSTRUCTION, FIRE AREA LIMITATIONS, AND ALLOWABLE BUILDING HEIGHTS THE DESIGN SHALL FOLLOW THE UNIFORM BUILDING CODE (UBC).

**CHECK LIST**

PROJECT NAME \_\_\_\_\_ DATE \_\_\_\_\_  
LOCATION \_\_\_\_\_  
\_\_\_\_\_

**4. UNIFORM BUILDING CODE ANALYSIS**

**4.1 OCCUPANCY CLASSIFICATION (See Table 5A):**

Area:                      Classification:  
                              (GROUP: \_\_\_\_\_): Div. \_\_\_\_\_  
                              (GROUP: \_\_\_\_\_): Div. \_\_\_\_\_  
                              (GROUP: \_\_\_\_\_): Div. \_\_\_\_\_

PRINCIPAL OCCUPANCY \_\_\_\_\_

OTHERS ( SPECIFY ) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**4.2 TYPE OF CONSTRUCTION : \_\_\_\_\_**

**4.3. OCCUPANCY SEPARATION REQUIRED ( SEE TABLE 5-B):**

_____	TO _____	= _____	HRS
_____	TO _____	= _____	HRS
_____	TO _____	= _____	HRS
_____	TO _____	= _____	HRS
_____	TO _____	= _____	HRS

**4.4 FIRE RESISTANCE OF EXTERIOR WALLS: ( SEE TABLE 5-A)**

NORTH \_\_\_\_\_  
SOUTH \_\_\_\_\_  
EAST \_\_\_\_\_  
WEST \_\_\_\_\_  
OTHER \_\_\_\_\_

**PART 3 - CODE ANALYSIS**

**UNIFORM BUILDING CODE (UBC) AND NFPA "LIFE SAFETY CODE" ANALYSIS**

**4. UNIFORM BUILDING CODE ANALYSIS**

**4.5 OPENINGS IN EXTERIOR WALLS: ( SEE TABLE 5-A)**

NORTH \_\_\_\_\_  
SOUTH \_\_\_\_\_  
EAST \_\_\_\_\_  
WEST \_\_\_\_\_  
OTHER \_\_\_\_\_

**4.6 MAX. ALLOWABLE FLOOR AREA ( SEE TABLE 5-C):**

ALLOWABLE:

IF SPRINKLERED: \_\_\_\_\_

ALLOW. AREA INCREASES \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

CALCULATED ACTUAL FLOOR AREA:

Floor	Square Footage
-------	----------------

Totals:

**4.7 MAX. ALLOWABLE HEIGHT ( SEE TABLE 5-D):**

FEET: \_\_\_\_\_  
STORIES: \_\_\_\_\_

Proposed Height of Building:

Actual No. of Stories:

**4.8 COMMENTS:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

DESIGNER: \_\_\_\_\_

**PART 3 - CODE ANALYSIS**

**UNIFORM BUILDING CODE (UBC) AND NFPA "LIFE SAFETY CODE" ANALYSIS**

**5. NFPA 101 "LIFE SAFETY CODE"**

5.1 CLASSIFICATION OF OCCUPANCY: \_\_\_\_\_

HAZARD OF CONTENTS:

LOW \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

ORDINARY \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

HIGH \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5.2. FIRE RESISTIVE REQUIREMENTS:

EXTERIOR WALLS: \_\_\_\_\_ HRS \_\_\_\_\_

INTERIOR WALLS: \_\_\_\_\_ HRS \_\_\_\_\_

STRUCTURAL FRAME: \_\_\_\_\_ HRS \_\_\_\_\_

VERTICAL OPENINGS: \_\_\_\_\_ HRS \_\_\_\_\_

FLOORS: \_\_\_\_\_ HRS \_\_\_\_\_

ROOFS: \_\_\_\_\_ HRS \_\_\_\_\_

EXTERIOR DOORS: \_\_\_\_\_ HRS \_\_\_\_\_

EXTERIOR WINDOWS: \_\_\_\_\_ HRS \_\_\_\_\_

BOILER ROOM ENCLOSURE \_\_\_\_\_ HRS \_\_\_\_\_

OTHER (LIST ) \_\_\_\_\_ HRS \_\_\_\_\_

\_\_\_\_\_ HRS \_\_\_\_\_

\_\_\_\_\_ HRS \_\_\_\_\_

\_\_\_\_\_ HRS \_\_\_\_\_

### PART 3 - CODE ANALYSIS

#### UNIFORM BUILDING CODE (UBC) AND NFPA "LIFE SAFETY CODE" ANALYSIS

##### 5. NFPA 101 "LIFE SAFETY CODE"

###### 5.3 MEANS OF EGRESS:

OCCUPANCY LOAD FACTOR: \_\_\_\_\_

OCCUPANCY	FACTOR	ACTUAL AREA	ACTUAL LOAD
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

###### 5.4 NUMBER OF EXITS REQUIRED: \_\_\_\_\_

###### 5.5 MINIMUM WIDTH OF EXITS:

CALCULATED: \_\_\_\_\_

ACTUAL: \_\_\_\_\_

###### 5.6 MAXIMUM ALLOWABLE TRAVEL DISTANCE TO EXIT: \_\_\_\_\_

WITH SPRINKLERS: \_\_\_\_\_

###### 5.7 EXIT DOORS:

MINIMUM WIDTH ALLOWED: \_\_\_\_\_

MAXIMUM LEAF WIDTH ALLOWED: \_\_\_\_\_

WIDTH REQUIRED FOR NO.OF OCCUPANTS: \_\_\_\_\_



### PART 3 - CODE ANALYSIS

#### UNIFORM BUILDING CODE (UBC) AND NFPA "LIFE SAFETY CODE" ANALYSIS

##### 5. NFPA 101 "LIFE SAFETY CODE"

###### 5.8 EXIT CORRIDORS:

MAX. COMMON PATH OF TRAVEL: \_\_\_\_\_  
MINIMUM ALLOWABLE WIDTH: \_\_\_\_\_  
REQUIRED TO HAVE EXIT AT EACH END OF CORRIDOR? \_\_\_\_

DEAD END CORRIDORS ALLOWED? \_\_\_\_\_  
MAXIMUM LENGTH: \_\_\_\_\_  
WALL FIRE RESISTANCE REQUIRED: \_\_\_\_\_

DOORS & FRAME FIRE RESISTANCE REQUIRED: \_\_\_\_\_

###### 5.9 STAIRS:

MINIMUM WIDTH \_\_\_\_\_ FOR OCCUP. LOAD OF \_\_\_\_\_  
MINIMUM WIDTH \_\_\_\_\_ FOR OCCUP. LOAD OF \_\_\_\_\_  
MINIMUM WIDTH \_\_\_\_\_ FOR OCCUP. LOAD OF \_\_\_\_\_  
MINIMUM WIDTH \_\_\_\_\_ FOR OCCUP. LOAD OF \_\_\_\_\_

MAX. RISER ALLOWED: \_\_\_\_\_  
MINIMUM TREAD ALLOWED: \_\_\_\_\_

###### LANDINGS:

MIN. SIZE: \_\_\_\_\_  
MAX. VERTICAL DIST. BETWEEN LANDINGS: \_\_\_\_\_

REQUIRED HEIGHT OF RAILINGS: \_\_\_\_\_

###### HANDRAILS:

REQUIRED AT EACH SIDE? \_\_\_\_\_  
INTERMEDIATE RAIL REQUIRED? \_\_\_\_\_  
HEIGHT ABOVE NOSING \_\_\_\_\_  
INTERMEDIATE RAIL REQUIRED? \_\_\_\_\_  
MAX. SPACE ALLOWED BETWEEN RAILS: \_\_\_\_\_

STAIR ENCLOSURE REQUIRED? \_\_\_\_\_

STAIR TO ROOF REQUIRED? \_\_\_\_\_

STAIR TO BASEMENT REQUIRED? \_\_\_\_\_

5.10 HATCHWAY ACCESS TO ROOF REQUIRED? \_\_\_\_\_

**PART 3 - CODE ANALYSIS**

**UNIFORM BUILDING CODE (UBC) AND NFPA "LIFE SAFETY CODE" ANALYSIS**

**5. NFPA 101 "LIFE SAFETY CODE"**

5.11 LADDER ACCESS TO ROOF REQUIRED? \_\_\_\_\_

5.12 HORIZONTAL EXIT REQUIREMENTS: \_\_\_\_\_

\_\_\_\_\_

5.13 PROTECTION OF OPENINGS NEAR EXTERIOR STAIR EXIT DOORS:

\_\_\_\_\_

5.14 SMOKEPROOF ENCLOSURE REQUIRED: \_\_\_\_\_

\_\_\_\_\_

5.15 RAMPS:

MAX. SLOPE TO USE AS EXIT \_\_\_\_\_

HANDRAILS REQUIRED? \_\_\_\_\_

5.16 COMMENTS:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

DESIGNER: \_\_\_\_\_

FOLLOWING IS A LIST OF ADDITIONAL "NFPA" CODES THAT ARE COMMONLY USED.  
INDICATE WHICH OF THESE CODES ARE USED AND ADD THOSE REQUIREMENTS TO THIS  
ANALYSIS.

MIL HDBK- FIRE PROTECTION FOR FACILITIES, ENGR,  
1008C DESIGN AND CONSTRUCTION.  
NFPA 10 FIRE EXTINGUISHERS, PORTABLE  
NFPA 80 FIRE DOORS AND WINDOWS

# ADA ARCHITECTURAL DESIGN CHECKLIST

Project Name:\_\_\_\_\_

Project Location:\_\_\_\_\_

Design Phase:\_\_\_\_\_

ITEM

NO.

INCORP INCORP N/A

LATER

1. Established with the Base/owner of the facility the  
for handicap accessibility.

\_\_\_\_\_

2. Received a waiver for no handicap accessibility requirements  
on the facility.

\_\_\_\_\_

3. Facility is designed utilizing:

New Construction Criteria

Building Alteration Criteria

Historic Building Preservation Criteria:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. Accessible Route (egress/corridors/halls/aisles).

- Provided minimum fire egress routes.

- Provided minimum site accessible routes.

- Provided proper clearance widths.

- Provided proper floor level changes.

- Provided proper floor materials.

- Provided protection from protruding objects.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

ITEM NO.	INCORP LATER	INCORP	N/A
5. Ramps:			
- Maximum slopes less than 1:12	_____	_____	_____
- Maximum run less than 9144mm for 1:12 slopes 12,192mm for 1:16 slopes	_____	_____	_____
- Minimum clear width exceeds 914mm.	_____	_____	_____
- Provided proper edge protection.	_____	_____	_____
- Provided handrails of proper configuration and diameter.	_____	_____	_____
- Provided proper handrail extensions at top and bottom of ramp.	_____	_____	_____
- Provided handrails at proper mounting heights.	_____	_____	_____
- Provided proper landings.	_____	_____	_____
- Provided proper cross slope on ramp surface.	_____	_____	_____
6. Stairs:			
- Protected the space below stairs from access by the blind.	_____	_____	_____
- Provided handrails of proper configuration and diameter.	_____	_____	_____
- Provided proper handrail extensions at top and bottom of stairs.	_____	_____	_____
- Provided handrails at proper mounting heights.	_____	_____	_____
- Provided treads greater than 279mm in width.	_____	_____	_____
- Provided proper nosings.	_____	_____	_____
7. Elevators:			
- Provided buttons and lanterns at the proper mounting height.	_____	_____	_____
- Provided Braille characters.	_____	_____	_____
- Provided proper door widths.	_____	_____	_____
- Provided proper clearance inside elevator car.	_____	_____	_____

ITEM  
NO.

INCORP INCORP N/A  
LATER

8. Doors And Hardware:

- Provided proper door widths.
- Provided proper clearance on both sides of jambs.
- Entrance vestibules provided with adequate clearances.
- Provided levers on locksets and exit hardware.
- Provided closers with mechanical adjustments.
- Provided accessible thresholds.
- Provided protection plates on doors heavily used by wheel chair bound people.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

9. Toilet Facilities:

- Provided proper floor clearance through out the toilet rooms.
- Provided minimum number of required accessible fixtures.
- Provided accessible toilet stalls.
- Provided stall doors with correct direction of swing.
- Provided accessible water closets.
- Provided grab bars at accessible water closets.
- Provided grab bars with correct configuration and dimension.
- Provided accessible sinks/lavatories.
- Provided accessible urinals.
- Provided accessible water coolers and fountains.
- Provided accessible mirrors.
- Provided accessible toilet accessories at required locations.
- Provided all fixtures and accessories at proper mounting heights and clearances.
- Provided insulated or protected exposed pipes at lavatories.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

10. Shower/Tub Facilities:

- Provided the minimum number of accessible showers/tubs.
- Provided showers/tubs with grab bars.
- Provided showers/tubs with seats as required.
- Provided controls mounted at the proper height and location.
- Provided proper clearances and dimensions in showers/tubs.
- Provided proper floor clearance through out shower/tubs rooms.
- Provided doors with correct direction of swing and clearance.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

ITEM NO.	INCORP LATER	INCORP	N/A
11. Storage:			
- Provided accessible cabinets, shelves, closets, and drawers as required.	_____	_____	_____
- Provided proper clearance, mounting heights, and reach provisions.	_____	_____	_____
12. Telephones and Vending:			
- Provided the minimum number of required accessible public telephones.	_____	_____	_____
- Provided proper floor clearance around telephone.	_____	_____	_____
- Phone and controls mounted at proper heights and within reach.	_____	_____	_____
- Provided vending machines on an accessible route.	_____	_____	_____
- Provided vending machines with accessible clearances and protruding object safe guards.	_____	_____	_____
13. Fixed Or Built-in Seating And Tables:			
- Provided the minimum number of accommodations for accessibility in areas which required fixed furniture.	_____	_____	_____
- Provided proper floor clearance around furniture.	_____	_____	_____
- Provide proper knee space at tables.	_____	_____	_____
- Provided tables and counters with proper top surface heights.	_____	_____	_____
14. Assembly Areas:			
- Provided the minimum number of accessible seating spaces.	_____	_____	_____
- Provided seating which is easily accessible to emergency egress.	_____	_____	_____
- Provided companion seating.	_____	_____	_____
- Integrated and dispersed accessible seating with the rest of the seating.	_____	_____	_____
- Provided accessible dressing rooms.	_____	_____	_____
- Provided level floor surface at accessible seat locations.	_____	_____	_____
- Provided clear ground or floor space at accessible seat locations	_____	_____	_____
- Provided access to all performing areas and associated spaces.	_____	_____	_____

ITEM NO.	INCORP LATER	INCORP	N/A
15. Dining Halls And Cafeterias:			
- Provided the minimum number of accessible dining spaces.	_____	_____	_____
- Provided accessible counters and bars.	_____	_____	_____
- Provided accessible aisles between tables or walls.	_____	_____	_____
- Provided clear floor space at accessible dining locations.	_____	_____	_____
- Provided accessible food service lines meeting minimum clearances and reaches.	_____	_____	_____
- Provided accessible tableware and condiment areas.	_____	_____	_____
- Provided raised speaker platform with protected edges.	_____	_____	_____
16. Medical Care Facilities:			
- At least 10% of the general patient rooms are accessible.	_____	_____	_____
- Provided the number of accessible patient rooms as required for specialized treatment, long term care, or alterations of existing patient rooms.	_____	_____	_____
- Provided at least one accessible entrance with weather protecting canopy or roof overhang.	_____	_____	_____
- Provided minimum clearances within the patient rooms and around the beds.	_____	_____	_____
- Provided accessible patient toilet/bath rooms.	_____	_____	_____
17. Business And Mercantile:			
- Provided at least one accessible sales counter, services counter, teller, information window, etc.	_____	_____	_____
- Security bollards when provided, do not prevent access or egress to people in wheel chairs.	_____	_____	_____

ITEM NO.	INCORP LATER	INCORP	N/A
18. Libraries:			
- Provided access to all reading and stack areas, reference reference rooms, reserve areas, and special facilities or collections.	_____	_____	_____
- Provided at least 5% or a minimum of one of each element or fixed seating, tables, or study carrels as accessible.	_____	_____	_____
- Provided at least one lane of check out areas as accessible.	_____	_____	_____
- Provided adequate clearance and reach distances at card catalogs and magazine displays.	_____	_____	_____
- Provide stacks with minimum clear aisle width.	_____	_____	_____
19. Temporary Lodging:			
- All common and public use areas are accessible.	_____	_____	_____
- Provided accessible units, sleeping rooms, and suites.	_____	_____	_____
- Provided sleeping accommodations for persons with hearing impairments.	_____	_____	_____
- Provided a dispersed class and a range of room options.	_____	_____	_____
- Provided accessible rooms in ADAL projects.	_____	_____	_____
- Provided an accessible route to accessible sleeping rooms.	_____	_____	_____
- Provided accessible clearance widths within sleeping rooms and around beds.	_____	_____	_____
- Provided accessible doors within accessible sleeping rooms.	_____	_____	_____
- Provided accessible fixed or built-in furniture and storage units.	_____	_____	_____
- Provided accessible controls throughout accessible units.	_____	_____	_____
- Where provided as part of an accessible unit each of the following were provided as accessible: living area, dining area, at least one sleeping area, patio/terrace/ balcony, toilet/bath, and carport/garage/parking.	_____	_____	_____
- Where provided as apart of an accessible unit, the kitchen, kitchenettes, wet bars, or similar amenities were also provided with accessible features.	_____	_____	_____
- Provided visual alarms, notification devices, and accessible telephones.	_____	_____	_____
- Provided accessible doors and doorways designed to allow passage into and within all sleeping units or other covered units.	_____	_____	_____



20. Transportation Facilities:

(This section covers Air, Rail, and Bus public transportation facilities. See Section 10 of the ADA Guide for specific requirements for these facilities)

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PART 3 NOT USED

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## SECTION 01338

### 100 PERCENT DESIGN REQUIREMENTS

#### PART 1 100 PERCENT DESIGN SUBMITTALS

For general submittal requirements, see Section 01332 SUBMITTALS DURING DESIGN.

Final drawings can be provided in either ArcView shapefiles or ArchInfo coverages. Data must be supplied in Colorado State Plane (central) NAD 83.

#### 1.1 SITE PLANNING

1.1 Drawings. All drawings shall be completely dimensioned in metric units, labeled, and noted. All approved comments from the 60 Percent Design Submittal shall have been incorporated. Cross-reference applicable sheets for items shown. Drawings required:

1.1.1 Location Plan and Vicinity Map

1.1.2 Removal Plan

1.1.3 Site Plan

1.1.4 Site Details

1.1.5 Landscape Plan

1.1.6 Landscape Details

1.1.7 Composite Utilities Plan

A Composite Utilities Plan shall be provided at a scale of 1:250 or 1:300. New and existing utilities shall be indicated. Plans shall show layout of the new and existing storm drainage systems, gas systems, sanitary systems, electrical systems, communication systems, water systems, steam systems and any other utilities which need to be provided for. Include new and existing contours.

#### 1.2 Specifications

a. Provide complete edited specifications for all items. Technical specifications shall be complete and fully coordinated with the drawings. All specification indexes shall be completely edited to reflect the paragraphs retained in the body of the specification. All references that have not been used in the body of the specification shall be edited from the technical specification.

b. Specifications shall be coordinated with the plans and include all items including seeding, sodding, trees and shrubs, and exterior furnishings, when applicable. Special sections shall be prepared to cover those subjects for which no pattern guide specifications are available. All UFGS guide specifications, to be provided, shall be in edited form showing all text to be deleted and added.

### 1.1.3 Design Analysis Narrative

Design analysis shall include the following:

### 1.3 References

Provide design references used in preparing the site design.

### 1.4 Basis For Design

The Design Analysis should give the basis, specific goals, objectives and priorities for site design of the project. Identify, explain and document use of design criteria and how the design meets goals, objectives and priorities. Identify the preferred site development concept. Document pollution prevention measures and other environmental considerations made during the design process.

### 1.5 CIVIL

#### 1.5.1 Drawings

##### 1.5.1.1 Grading and Drainage Plan

A final grading and drainage plan shall be provided at the same scale as the site plan. New and existing grading contours shall be indicated at 0.25 meter contour intervals. Indicate the finished floor elevation of all new buildings and structures. Plans shall show the layout of the new and existing storm drainage and roof drainage systems. Provide spot elevations at building corners, parking area corners, changes in grade, etc. Storm drainage lines and structures shall be labeled. The rim elevation of all manholes, curb inlets, and area inlets shall be indicated. Provide location and description of benchmarks and indicate vertical and horizontal datums.

##### 1.5.1.2 Storm Water Pollution Prevention Plan (SWPPP) Site Map

Provide a site map indicating drainage patterns and approximate slopes anticipated after major grading activities, areas of soil disturbance, areas which will not be disturbed, locations of major structural and nonstructural erosion controls identified in the SWPPP, locations where stabilization practices are expected to occur, locations of off-site material, waste, borrow or equipment storage areas, surface waters (including wetlands), and locations where storm water discharges to a surface water.

##### 1.5.1.3 Grading Sections

The preliminary grading sections provided at 60% shall be revised as necessary.

##### 1.5.1.4 Storm Drain and Culvert Profiles

Provide profiles of all new storm drains and culverts showing new and existing grades, new and existing utilities, pavement sections in detail, pipe diameters and lengths, pipe slopes, invert elevations, etc. Class and gauge of all storm drain and culvert pipes shall be provided. Profiles of roof drain runout lines may or may not be provided at the Contractor's discretion. However, invert elevations, lengths and pipe diameters of these roof drains lines shall be called out on the drawings.

#### 1.5.1.5 Drainage Structure Details

Provide typical details of all storm drainage structures. Unless otherwise directed, use Omaha District standard detail drawings. The use of alternate details shall be approved prior to submitting the final design documents. A, B, C, and D dimensions of all storm drain and subdrain structures shall be shown. Dimensions may be shown on either the storm drain schedule, the storm drain profiles, or on the storm drain structure detail drawings.

#### 1.5.1.6 Pavement Details

Provide details of concrete curb and gutter, integral curb, typical pavement sections, typical sidewalk section, pavement utility cut details, and interface detail between new and existing pavements.

#### 1.5.1.7 Pavement Joint Layout Plans

Provide pavement joint layout plans with spot elevations at joint intersections for all new concrete pavements. Each type of joint shall be shown with a different symbol and a joint legend provided. Pavement joint layout plans shall be drawn at a scale of 1:100 or 1:200. Under no circumstances shall pavement joint layout plan be combined with any other plans.

#### 1.5.1.8 Concrete Pavement Joint Details

Provide concrete pavement joint details. Use Omaha District standard detail drawings.

#### 1.5.1.9 Erosion Control Details

Provide details of best management practices used to control erosion.

#### 1.5.2 Specifications

Provide complete edited specifications for all items. Technical specifications shall be complete and fully coordinated with the drawings. All specification indexes shall be completely edited to reflect the paragraphs retained in the body of the specification. All references that have not been used in the body of the specification shall be edited from the technical specification.

#### 1.5.3 Design Analysis Narrative

Design analysis shall include the following:

##### 1.5.3.1 References

Provide design references used in preparing the civil design.

##### 1.5.3.2 Grading

A narrative of the grading design and criteria used.

##### 1.5.3.3 Drainage

A narrative of the drainage design and criteria used. Include information



on the storm drain pipe materials selected and their ability to withstand earth dead loads and live loads that will be imposed.

#### 1.5.3.4 Pavements

A narrative of the pavement design and criteria used.

#### 1.5.4 Design Analysis Calculations

##### 1.5.4.1 Storm Drainage System Calculations

Storm Drainage System Calculations shall include the following:

- a. Drainage area map showing boundaries of each drainage area and respective drain inlet or culvert.
- b. Storm run-off calculations for each drainage area.
- c. Tabulation of capacities of new storm drains including: diameter and slope of storm drain pipes, design storm discharge and velocity for each storm drain pipe, maximum discharge capacity of each storm drain pipe, headwater depth of each culvert during design storm discharge.
- d. Hydraulic capacity calculations for each new curb and area inlet.

##### 1.5.4.2 Pavement Design Calculations

Calculations used to obtain the pavement design.

#### 1.6 GEOTECHNICAL

##### 1.6.1 Drawings

###### 1.6.1.1 Boring Location Plan

A boring location plan shall be provided. The boring location plan shall be at the same scale used for the Site Plan. See the RFP drawings for a copy of the boring location plan that was used in the preparation of the Final Foundation Report.

###### 1.6.1.2 Boring Log Sheet

Boring logs shall be provided on a separate sheet of the drawings. See the RFP drawings for a copy of the boring logs that were used in the preparation of the Final Foundation Report.

##### 1.6.2 Design Analysis

A copy of the Final Foundation Report, see Attachment No. 1, shall be included as an appendix to the Design Analysis.

#### 1.7 WATER SUPPLY AND WASTEWATER

##### 1.7.1 Drawings

Generally, the corrected and approved 60 percent plans may be used as the basis for the final plans. However, all details necessary for complete construction must be included. The 100 percent final design submittal

shall include all the information presented in the 60 percent submittal, updated to final design status, corrected to reflect any changes made in response to review comments, and shall include the additional requirements specified hereinafter. Any concerns in developing the final design documents shall be resolved prior to starting the final design stage.

#### 1.7.1.1 Water Distribution and Sewage Collection Systems Plans (including building services)

Provide all existing utilities and above ground features, including sizes and material types, which may pose as an obstacle (i.e., water, sewer, gas, electrical, etc.) on the basic site plan layout. Indicate existing pipe material and sizes where new lines connect along with the type of connection and elevations of connections. Provide all new water and sewer lines with sizes. This will include all new service lines, up to within the 1.5 meter building line. Locations of all new manholes, fire hydrants, valves (including PIV's), similar appurtenances, and connection points shall be provided. Show contours on plan view. Include stationing on both plan and profile sheets.

#### 1.7.1.2 Water Distribution and Sewage Collection Systems Profiles

Profiles of all gravity sewers and waterlines shall be provided. Profiles may be omitted for short waterlines, unless necessary to assure adequate cover or avoid interference with other underground facilities. Indicate existing pipe material and sizes where new lines connect. Indicate type of connection and elevation. Include all interference elevations.

#### 1.7.1.3 Water Distribution and Sewage Collection Systems Details

Appropriate water and sewer details shall be provided. Use Omaha District standard detail drawings. The standard detail sheets will be furnished if required. For roadway pavement crossings, indicate installation method (open cut, boring, jacking, etc.). Include standard casing details.

#### 1.7.2 Specifications

Specifications shall be coordinated with the plans and include all items. Provide special sections to cover those subjects for which no UFGS guide specifications are used or available. These special sections shall include all approved changes from the 60 percent review stage. All UFGS guide specifications, to be provided, shall be in edited form showing all text to be deleted and added.

#### 1.7.3 Design Analysis Narrative

Design analysis shall include the following and all applicable data contained in the 60 percent design analysis narrative shall be repeated. References shall not be made to the previous design analysis. The final design analysis shall be corrected to reflect changes in content made in response to review comments, and shall be expanded to reflect the completed design.

##### 1.7.3.1 References

Provide design references used in preparing the water and wastewater design.

##### 1.7.3.2 Water Supply and Distribution Systems

A narrative of the water supply and distribution systems design and applicable criteria used shall be provided. Include the peak and average domestic demands, the interior and exterior fire flow requirements and the available flow and residual pressures. A description of the water distribution system, and complete calculations necessary to support equipment, piping sizes, interior and exterior fire demands, and domestic demands, etc. shall be provided.

#### 1.7.3.3 Wastewater and Sewers

A narrative of the wastewater supply design and applicable criteria used shall be provided. Include the average and peak contributing flows along with the available capacity and full flow capacity of the existing system. A listing of allowable piping materials, and complete calculations necessary to support equipment and piping sizes shall be provided.

### 1.8 ARCHITECTURAL

#### 1.8.1 Drawings

The drawings shall be complete, include all necessary and required details, thoroughly checked, and fully coordinated with the technical Specifications and all other Construction Documents. Previous comments and applicable criteria changes shall have been incorporated into the design. The contract drawings shall fully describe the type and the scope of work required. The layout of individual sheets and the organization of the assembled set shall follow and communicate a logical sequence. General information shall be presented first, progressing to more detailed information. When assembling details, begin in the upper left-hand corner of the sheet with letters progressing to the right and down. When dimensioning, use arrowheads, not dots or slashes. Where major structural elements are included as parts of architectural detailing, do not indicate sizes. These elements must be fully defined in the structural design documents. See 60% Architectural drawing submittal requirements for drawing scales of remaining drawings to be submitted. Include all drawings from the 60% submittal plus all additional detail drawings required for complete 100% design. These shall include but not be limited to the following:

- Floor Plans
- Removal Plans
- Interior Elevations and Details
- Door Details
- Window Details
- Louver Details
- Roof Details
- Stair Details
- Casework Plans, Elevations, and Details
- Wall Plan Details and Plan Details
- Fire Wall Details and Penetration Conditions
- Sealant Details
- Ceramic Tile Details
- Ceiling Details
- Control/Expansion Joint Details
- All Miscellaneous Details
- All floor & Wall Patterns/Borders

#### 1.8.2 Technical Specifications

The technical specifications shall be complete and fully coordinated with the drawings. Special sections shall be prepared to cover those subjects for which no pattern guide specification is available. Notes to the Designer that accompany specifications shall be used in editing technical guide specifications. All specification indexes shall be completely edited to reflect the paragraphs retained in the body of the specification. All UFGS guide specifications shall be edited in accordance with Section 01332 SUBMITTALS DURING DESIGN.

#### 1.8.3 Design Analysis Narrative

The Design Analysis shall include the basic information presented in the previous submittal, corrected to reflect changes in content made in response to review comments. Outline specifications shall be omitted from the Final Design Analysis as the information is included on the final drawings and project specifications. The design analysis shall be written in the present tense.

#### 1.8.4 Design Analysis Calculations

The Design Analysis calculations shall include the basic information presented in the previous submittal, corrected to reflect changes in content made in response to review comments.

#### 1.8.5 Common Deficiencies

Some repeated errors have occurred in the preparation of design documents in the past. Subsequently these errors have been identified and the Contractor directed to make corrections. The work involved in such corrections becomes lost effort and time for the designer. Some of these errors which are most often overlooked include:

- a. Not using correct abbreviations or terminology on the drawings. Abbreviations must match what is used on the standard abbreviation sheet and terminology must match what is used in the standard technical guide specifications.

- b. Not using the correct scales, north arrow designation, section cut system, or incomplete dimensioning on the drawings.

- c. Not providing sufficient space for door operation hardware at doors which swing into a wall running perpendicular to the opening. 100 mm minimum is required between edge of door frame and perpendicular walls.

- d. Not providing correct and complete Design Analysis information written in the present tense. The Design Analysis will be written following the format indicated herein. A separate Fire Protection section in the Design Analysis with input from all disciplines is one area which is often overlooked and shall be included.

- e. Not providing a structural stoop at exterior doors where the slab is at the same approximate elevation as the interior floor. The use of simple slabs on exterior grade leads to lifting of the slab in below-freezing temperatures which interferes with the safe operation of the door.

- f. Not correctly presenting or coordinating (to avoid interference) features of Fire Protection, Noise Control, and Physical

Security.

g. Not correctly referencing and cross referencing building sections, wall sections, details, etc.

h. Failure to read/use technical notes in editing the Technical Guide Specifications.

i. Failure to coordinate all disciplines prior to submittal of projects for review.

j. Improper use of fire-retardant wood. Fire-retardant wood is combustible; its use in buildings that are of noncombustible construction is extremely limited (see UBC for the minor allowable uses). Because of the potential for severe degradation, fire retardant plywood shall not be used in a roof or roofing system, or in structural applications.

k. Incorrectly listing trade names in door hardware specifications in lieu of ANSI numbers and failure to correctly specify hardware finishes.

l. Control joints in CMU walls and brick expansion joints in face brick are not shown on both architectural plans, elevations and structural plans, or are inconsistent. Note also control joint locating and coordination for floor tile per Tile Council of America recommendations.

m. Failure to delete all publications which do not apply to the particular project.

n. North is not oriented the same direction on all sheets (civil, site, arch).

## 1.9 INTERIORS

### 1.9.1 DESIGN ANALYSIS/NARRATIVE

Updates as a result of the 60% review conference shall be made to the design analysis.

### 1.9.2 TECHNICAL SPECIFICATIONS

Technical specifications shall be in final form for construction (in accordance with the requirements of Section 01332 SUBMITTALS DURING DESIGN) and shall include all changes requested during the 60% review stage. All specifications shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product, installation requirements, and testing methods for this facility.

### 1.9.3 COLOR BOARDS AND LEGENDS

Color boards shall show actual color samples of all proposed exterior and interior finishes, specialties, and prewired work stations. A color board legend shall accompany the boards and shall clearly identify all finishes. Clarification of finish placement shall be required when more than one color of a single finish is proposed. Color boards shall be 8 1/2" x 11" in size and be provided in a three ring binder. Include project name and location, design stage and date on the front cover and spine of the binder.

#### 1.10 FURNITURE FOOTPRINT

Changes and updates requested during the 60% review stage shall be incorporated into the furniture drawings.

#### 1.11 FURNITURE PACKAGE

Submittal requirements shall comply with the 90% submittal requirements of the Air Force Center for Environmental Excellence (AFCEE) Interior Design Presentation Format for Comprehensive Interior Design (CID). Requirements for Interior Color Rendering, Black and White Sketch Perspective and Manufacturer's Summary Lists are not required for this project.

#### 1.12 STRUCTURAL

##### 1.12.1 DRAWINGS

Final drawings shall be complete, thoroughly checked, and fully coordinated with the other disciplines, specifications and all other construction documents. Previous comments and applicable criteria changes shall have been incorporated into the design. The drawings shall be complete with all plan views, elevations, sections, details, schedules, diagrams, and notes necessary for the construction of the project. For structural steel framing, the drawings shall meet the requirements for design drawings set forth in the AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings. All structural steel members and connections shall be fully detailed. Design of structural steel connections shall be the responsibility of the structural design engineer and shall not be delegated to the steel fabricator. For structural concrete, the drawings shall conform to the standards for engineering (design) drawings set forth in the ACI Detailing Manual-1988 (SP-66). Additionally, those items described below which are applicable to the design shall be incorporated into the drawings. Drawings shall be at a scale appropriate for the design, in no case however, shall plan type drawings be done at a scale smaller than 1:100 or detail type drawings at scale smaller than 1:20.

##### 1.12.1.1 Grid Systems, Dimensions, and Floor Elevations

Each foundation and slab plan, floor framing plan and roof framing plan shall have an alpha-numeric grid system aligned with any columns or pilasters, or with load bearing and non-load bearing walls, as applicable. The same grid system shall be used for all plan views. Each plan view shown shall have all necessary dimensions. On plan views, the dimensions shall define the location of grid lines, offsets, and all structural elements, as well as the overall sizes of the structure. The finish elevation of the ground floor slab shall be indicated as 100000 mm, and elevations for all other structural elements shall be numerically referenced to this basic elevation.

##### 1.12.1.2 Plan Sheets

###### a. Foundation and Slab Plans

Foundation and slab plans shall show the size and location of all foundation elements, such as foundation walls and footings. Elevations for footings shall be indicated on the plan. Plans for slabs-on-grade and exterior stoop slabs at building entrances shall show location and type of

joints, slab thicknesses and reinforcing, elevation of slab surfaces, and any other design features, such as equipment bases and areas of depressed slab surface, which affect the slab design. Also, indicate that slabs are placed over vapor barrier and capillary water barrier.

b. Roof Framing Plans

Roof framing plans shall be provided for all parts of the structure. Plans shall show the size, spacing, and location of all roof framing members, their supporting columns, pilasters or walls, all auxiliary members such as bracing and bridging, orientation and extent of coverage of structural roof deck materials, and the size, location, and framing of all major openings through the roof.

1.12.1.3 Elevation Views, Sections and Details Sheets

Elevation views, sections and details necessary to illustrate fully the design shall be provided. Some requirements peculiar to the various structural materials are described below.

a. Concrete

Include elevation views as necessary, plus sections and details to show the outlines of concrete cross-sections, reinforcing bar arrangements, concrete cover for rebar, installation of embedded items, and joint construction. All lap splice and embedment lengths for reinforcing bars shall be clearly indicated on the drawings. A sill detail for each foundation condition at exterior and interior doors shall be provided.

b. Masonry

Wall reinforcing shall be located and identified on plans, in section cuts, elevation views or in schedules. Structural elevations when needed shall be included to clarify the construction requirements for masonry reinforcement, especially the reinforcement around wall openings. Details applicable to the project shall be shown on the structural drawings. Listed below are some frequently required masonry details, most of which are shown in Army Corps of Engineers TI 809-04, Air Force Technical Manual AFM 88-3, Chap. 3, and on the Typical Masonry Sheets. The Typical Masonry Sheets will be provided to the successful offerer upon request and may be edited and incorporated into the final drawings as needed. Additional details as required shall be extracted from other sources and incorporated into the final drawings. All details shall be fully edited to reflect the specific requirements of this project. Supplemental details shall be added as necessary to complete the design.

Masonry Details Frequently Used

- Masonry Control Joint (MCJ).
- Control Joint at Bond Beam.
- Bond Beam Corner Reinforcement.
- Seismic Reinforcement Around Wall Openings.
- Wall Reinforcement Details for 1 and/or 2 bar-per-cell stiffeners.
- Doweled or Other Connection of Masonry to Foundation, Floor, Roof or Bond Beam.
- Bond Beam (or Steel) Lintels and Bearing Details
- Lateral Support Detail for Top of Masonry Partition Walls.  
(lateral support locations must be shown on framing plan sheets.)

c. Structural Steel, Steel Joists, and Steel Decking

Structural steel connections shall be fully detailed and shown on the drawings. The anchorage of beams, trusses, joists, and steel deck to walls or other bearings, and the extra framing or reinforcement required at deck openings shall also be detailed. Notes, details, or schedules on the drawings shall indicate the steel deck attachment method to be used, and shall give the size and spacing for perimeter, side lap, intermediate supports and end lap attachments. Welded connections shall be detailed using standard weld symbols illustrated in AWS D1.1. All applicable weld sizes, spacing, types, contours and finishes shall be shown.

1.12.1.4 Schedules

a. Foundation Schedules

Foundation schedules for footings and piers shall be included, as applicable. The schedule shall include all pertinent information required for the foundation system being used.

b. Framing Schedules

For concrete framing, beam and column schedules shall conform to the requirements of the ACI Detailing Manual. For structural steel framing, provide a column schedule complete with column base plates and design loads at splices, if any, and at column bases.

1.12.1.5 Equipment Loads

All equipment loads which exceed 44N and are not supported by concrete slab-on-grade shall be identified on the drawings by showing equipment locations, total weights, and reaction loads at support points.

1.12.1.6 Notes

a. Design Notes

Under the heading "Designer's Notes," the structural drawings shall contain notes which begin: "The structural design was prepared using the following data:". The data then listed shall include the structural loading criteria used for design, such as roof and floor live loads, snow load design parameters, wind speed and wind load design parameters, seismic design parameters, allowable soil bearing pressures (as recommended by the Final Foundation Analysis report), foundation design depth, design wind uplift pressures for steel joists and other data pertinent to future alterations. Also, to be listed are the ASTM designations and stress grades of the applicable structural materials: steel, masonry, concrete for each usage, reinforcing bars, welds, and bolts.

b. General Notes

Other notes, which direct the work to be performed, the materials to be used, etc., shall be grouped under the heading of "General Notes." Included in these notes should be a description of the building's structural system, if necessary.

1.12.2 SPECIFICATIONS

Technical specifications for final design shall be prepared in accordance



with the instructions provided in Section 01332 SUBMITTALS DURING DESIGN, Paragraph 3.2 "Specifications". The technical specifications shall be complete and fully coordinated with the drawings. All specification indexes shall be completely edited to reflect the paragraphs retained in the body of the specification. All references that have not been used in the body of the specification shall be edited from the technical specification.

#### 1.12.3 DESIGN ANALYSIS NARRATIVE

The final design analysis narrative shall repeat and expand upon the basic information presented in the 60% design analysis narrative, and shall be corrected to reflect revisions made for the final design.

#### 1.12.4 DESIGN ANALYSIS CALCULATIONS

Calculations shall be prepared by an experienced structural engineer and shall include an investigation of loading, (gravity, wind, seismic, etc.) shear, moment, wind uplift, stability and deflection calculations. The computations are to be systematic and accurate. Similar beams, columns, panels, or connections may be grouped by designing the largest member or connection in the group, but every individual slab, beam, column, footing, connection or other structural member or structural consideration indicated by the plans shall be accounted for by pertinent calculations, statement or reasoning, or reference to source. Design formulas shall be written out in symbols the first time each is used, before the numerical values are supplied. All answers shall be identified by dimensional units. Basic assumptions of loads, working stresses, and methods of analysis must appear in the calculations; these assumptions must be applied consistently to a given problem. The calculations shall be presented in a clear and legible form, incorporating a title page, table of contents, and a tabulation showing all design loads and conditions. Pages shall be numbered consecutively and identified in the table of contents. Cross referencing shall be clear. The source of loading conditions, formulas, and references will be identified. Assumptions and conclusions will be explained. Superseded areas of computations must be ruled out. All computations shall be given a complete numerical and theoretical check within the Contractor's office. Calculation sheets shall carry the names or initials of the developer and the checker, and the dates of calculations and checking. No portion of the design calculations shall be developed and checked by the same individual.

##### 1.12.4.1 Computer Calculation Submittals

All applicable input and output data shall be included in readable printed form as part of the design calculations. Continuous paper such as that used in computer terminals or printers shall be cut into individual pages and shall not be submitted in a continuous roll form. All input and output data shall include a brief synopsis of the computer program(s) stating required input, method of solution, approximations used, codes and specifications used, output generated, extent of previous usage or certification of the program(s), and program author(s). Generalized flow chart(s) may be used to supplement description of solution process, if desired. All computer generated and long-hand calculation sheets shall be identified by sheet number, indexing and cross-referencing. Each member or structure being analyzed shall be identified, dimensioned and shown in a loading diagram. A separate diagram shall be provided for each load case, such as dead plus live, dead plus wind, etc. Input and output values including intermediate values shall clearly be identified if such values

are necessary for evaluation of the submittal.

### 1.13 MECHANICAL

The 100 percent final design submittal shall include all the information presented in the 60 percent submittal, updated to final design status, corrected to reflect any changes made in response to review comments, and shall include the additional requirements specified hereinafter. Any concerns in developing the final design documents shall be resolved prior to starting the final design stage.

#### 1.13.1 DESIGN DRAWINGS

The final design drawings shall be fully coordinated with the design analysis and specifications. Provide sufficient plans, piping diagrams and isometrics, mechanical room sections, water and air flow diagrams, details, schedules, control diagrams, sequences of operation, etc., as necessary to define the design requirements. Large-scale plans of congested areas shall be provided. Coordinate with architectural design for provision of access panels for all concealed valves, traps and air vents, etc. Floor plans shall use the architectural floor plans as a basis, with the building outline half-toned. The final design drawings shall include all the requirements and drawings defined for the 60 percent submittal. In addition, the following new drawing requirements and drawings shall be provided:

##### 1.13.1.1 Mechanical Abbreviation, Legend, and General Notes Sheet

On this sheet, include any mechanical general installation notes that may be required to clarify the construction intent that may not be readily apparent in the specifications or on the drawings. General notes may be provided on a separate sheet if space does not exist on the Abbreviation and Legend sheet.

##### 1.13.1.2 Plumbing Drawings

###### Enlarged Toilet Room Plans:

Enlarged toilet room plans showing all fixtures, water, waste, and vent piping shall be provided for each toilet area. Enlarged plans shall be drawn at a minimum 1:50 scale.

##### 1.13.1.3 Mechanical HVAC Drawings

###### Hot Water System Flow Diagrams:

Provide a hot water flow diagrams showing the boiler, pumps, and all connected heating equipment including radiant floor heating systems. Each equipment item shall show associated flowrate. All thermometers, pressure gauges, isolation and control valves, bypass piping, etc. shall be shown on the flow diagram.

###### Chilled Water System Flow Diagrams:

Provide a chilled water flow diagrams showing the coolers, pumps, and all connected cooling equipment. Each equipment item shall show associated flowrates. All thermometers, pressure gauges, isolation and control valves, bypass piping, etc. shall be shown on the flow diagrams.

#### 1.13.1.4 HVAC Control Drawings

In addition to the updated Controls Legend and System Block Diagram Sheets, final HVAC control drawings for each system and item of equipment shall be in accordance with the following requirements:

##### Control Diagrams:

Control Diagrams shall be provided for each system or item of equipment. Systems diagrams shall include every major component installed in or connected to the system, and only one system shall be shown on each diagram. Control Diagrams shall schematically show all sensors, controllers, actuators, indicators, and operator interface devices that are required for the complete automatic control and monitoring of the system. All sensing devices utilized in the control or instrumentation of the system, and all actuating devices shall be shown in their correct mechanical location and functionally interconnected to the other control devices which comprise the control loop. All controlling devices shall be shown with all functional interconnections to inputs and outputs. Each sensing, controlling, actuating, and indicating device shall have its own unique control loop tag identifier. Communication linkages required to complete the entire intended interface between operators and the control system shall be shown schematically. This includes interconnections between local temperature control panels and the base EMCS. All associated thermometers and pressure gauges, located in their correct mechanical locations, shall also be shown on the diagrams. See furnished Example HVAC Control Drawings for the required level of detail and formatting.

##### Sequence of Operations:

Sequence of Operations shall be provided for each item of equipment or system and shall fully describe the intended operation of the equipment or system in all different operating modes. As identified on the furnished Example Control Drawings, each Sequence shall be broken down by individual control loops and shall include descriptions of both normal operating modes (running, shutdown, standby, etc.) and abnormal, emergency or safety related modes. Sequences shall include a description of all indication instrumentation, alarm conditions, and automatic actions to be taken upon occurrence of alarm conditions. Each device referenced in the sequence shall be referred to by its unique tag identifier, with each component designator shown in parenthesis. Design set points shall be specified for each control loop and indicated as being adjustable. See furnished Example HVAC Control Drawings for the required level of detail and formatting.

The designer shall analyze every component of each system and write each Sequence of Operation to compliment the Functional Performance Checklists. The Sequence of Control on the project drawings shall be explicit and written to ensure that all the requirements of the "Functional Performance Test Checklists" can be accomplished.

##### Control Points Lists:

Control points lists, identifying each temperature control system input and output, shall be developed for each temperature control panel. See furnished Example HVAC Control Drawings for the required level of detail and formatting.

#### 1.13.2 TECHNICAL SPECIFICATIONS

The submitted 60 percent technical guide specifications shall be updated, completely edited, and fully coordinated with the drawings to accurately and clearly identify the final product and installation requirements for the facility.

#### 1.13.3 DESIGN ANALYSIS NARRATIVE

The Final Design Analysis Narrative shall include the information presented in the 60 percent submittal, shall be corrected to reflect changes in content made in response to review comments, and shall be expanded to reflect the completed design.

#### 1.13.4 DESIGN ANALYSIS CALCULATIONS

The Final Design Analysis calculations shall include all the information presented in the 60 percent submittal, shall be corrected to reflect changes in content made in response to review comments, and shall be expanded to reflect the completed design. In addition, the following new calculations shall be provided:

- a. Pipe sizing calculations for the chilled & heating hot water, plumbing, gas piping systems.
- b. Chilled & heating hot water pump head calculations.
- c. Chilled & heating hot water expansion tank sizing.
- d. External static pressure calculations for all fans.
- e. Control Valve CV calculations.
- f. Electrical/Communications room calculations

#### 1.14 ELECTRICAL

##### 1.14.1 Drawings

Drawing scale shall match architectural drawing requirements.

##### 1.14.1.1 Interior Drawings

Drawings shall be complete and accurate in every detail and shall include arrangements and types of light fixtures, receptacles, switching, location of special features, necessary details, including legends, fixture schedule, panel schedules, one-line diagrams, layout or functional diagrams for each of the various systems, riser diagrams if applicable, estimated maximum demand for each panel and for entire building and any other relative information which will help clear up any and all questionable items on the plans or in the specifications toward the development of a set of plans which will be clear, concise and correct. Additional drawing requirements for specific equipment or systems have been included in subsequent paragraphs pertaining to the equipment or systems.

##### 1.14.1.2 Floor Plans

All rooms must be identified by name and number. Plans must be legible. Plans shall be developed using the same scale and areas as the architectural floor plans. Separate floor plans must be provided for

lighting, power, communications, and fire detection.

#### 1.14.1.3 Diagrams

The power one-line diagram shall be on a dedicated sheet. The diagram should show ratings of major equipment including short circuit ratings. Power, communications diagrams, fire detection and telephone diagrams should be on separate sheets also.

#### 1.14.1.4 Schedules

Provide panelboard and lighting fixture schedules. Panelboard schedules shall include the designation, location, mounting (flush or surface), number of phases and wires, voltage, ampacity and total connected and demand load. Indicate the trip rating, frame size, interrupting rating and number of poles for each circuit breaker in the panelboards. List the circuit number, circuit description and load for each branch circuit.

#### 1.14.1.5 Exterior Drawings

Drawings shall be complete and accurate in all details and shall include the routing of all feeder and branch circuits.

#### 1.14.2 Specifications

All specifications shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product, installation requirements, and testing methods for this facility.

#### 1.14.3 Design Analysis Narrative

The text of the preliminary design analysis should be expanded to reflect the completed design. Calculations used to develop the design should be included. The document in its final form should conform in all applicable respects to the requirements of Section 01007 ELECTRICAL DESIGN REQUIREMENTS.

#### 1.14.4 Design Analysis Calculations

Backup data shall be furnished to support basic design decisions related to sizing of major equipment and materials, selection of economic alternatives, performance of specific systems or equipment. Calculations may be performed by manual or computerized procedures. Use of standardized charts, curves, tables, graphs will generally be acceptable for portions of required calculations or in lieu of specific calculation procedures. Such data must be from a recognized source which is identified in the design analysis. If possible, a copy of applicable sheets or pages should be included with the calculations. For given equipment, the calculations must conform to requirements identified under subsequent paragraphs herein pertaining to the equipment.

##### 1.14.4.1 Service

Sizing of building service.

##### 1.14.4.2 Transformers

Sizing of all transformers. (Generally for dry type transformers, 1 or 2 samples of detailed calculations to identify the method are sufficient, if

input data for remaining units can be derived from panel or feeder sizing data.)

Exterior Pad-mounted oil-filled transformers shall be sized based upon the following equation. KVA of the transformer selected shall be the standard commercial size, equal to or greater than the computed size. The equation shall be:

$$\text{kVA} = \frac{\text{kW}}{\text{TF} \times \text{OF} \times \text{PF}}$$

kVA = Minimum Transformer Capacity  
kW = Estimated Maximum Demand (EMD) in kilowatts  
TF = Temperature Correction Factor (i.e., + 30% = 1.30; -10% = .90).  
OF = Short Time Overload Factor 1.24  
(oil filled units only) (assuming maximum duration of 2 hours per 24 hour period).  
PF = Power Factor

Temperature Correction Factor is calculated in the following manner. Temperatures are taken from AFM 88-8, Chapter 6 (TM 5-785) titled "Engineering Weather Data", dated 15 June 1978.

Summer Month Correction Factor: Temperature data is from Section A "Heating Design and Air Conditioning Design" (page 1), using the 1% Dry Bulb Temperature for A.C. criteria (1 percent dry bulb is the warmest average temperature during the warmest 4 months of the year). A 30 degree C equals 0% correction factor. Each degree C above 30 degree C is equal to -1.5% correction factor. Each degree C below 30 degree C is equal to +1.0% correction factor.

Winter Month Correction Factor: Temperature data is from Section C "Data for Calculating Energy Use for U.S. Sites" (page 105), by using "Heating Season Table", coldest month, minimum of two total observations and the highest temperature in the Temperature Range Column (5 percent temperature range dry bulb). A 30 degree C equals 0% correction factor. Each degree C below 30 degree C is equal to +1.0% correction factor.

In all cases, dry bulb temperatures were used in lieu of wet bulb readings, because the effects of humidity on a transformer appear to be negligible.

#### 1.14.4.3 Feeders

Sizing of feeders (One detailed sample calculation is sufficient to establish the procedure, remaining data can be in schedules, tables, etc.).

#### 1.14.4.4 Panelboards

Sizing and loading of panelboards and distribution equipment.

#### 1.14.4.5 Voltage drop determination

Provide voltage drop calculations in accordance with IEEE 241 to demonstrate that the voltage drop requirements of NFPA 70 are satisfied.

Calculations must be in accordance with the NEC and applicable IEEE guidelines. The following or equivalent formula should be used  $V_d = I(R \cos \theta + j \sin \theta)$ . Interpolation and projection techniques may be used (i.e., a

calculation for a 120 foot feeder to a 225A panel would not be necessary if a calculation for a 130 foot feeder to a 225A panel had already been performed). Calculations must be sufficient to encompass the application range of the project.

Distribution system design for voltages over 600 volts shall be based on a maximum of 2% voltage drop.

Distribution and branch circuit system design shall be based on a maximum of 5% voltage drop from the transformer to the utilization equipment. This shall be split such that there will be 3% or less voltage drop from the transformer (service drop, service entrance, etc.) to the branch circuit panelboard (proportioned most economically between the service and feeder conductors) and 2% voltage drop or more on branch circuits.

#### 1.14.4.6 Illumination calculations

Data should identify target and calculated illumination levels for all rooms and areas. Calculations should be adjusted to compensate for special applications -- irregularly shaped rooms, open sides, ceiling obstructions (beams, ductwork), corridors, etc. If the lumen method is used for corridor calculations, the calculations should be performed using a module in which the length does not exceed 3 times the width (2:1 ratio preferred).

Computations shall be based on the simple lumen method using coefficients of utilization corresponding to 80 percent ceiling and 50 percent wall reflectance factors in office type applications (white suspended ceilings and light colored unobstructed walls). The floor coefficient of utilization factor shall be 20 percent for most areas with dark carpeting or tile. Lower levels shall be used such as 50 percent/30 percent factors for applications with CMU walls, dark colors, irregular surfaces and/or structural obstructions. A maintenance factor of 0.7 shall be used for the typical application (this value shall be adjusted for non-typical applications - 0.75 or 0.8 for a well maintained office or lab with a filtered air supply, 0.65 for a mechanical room with minimal maintenance).

#### 1.14.4.7 Short Circuit Evaluation

Calculate the fault current in accordance with IEEE 242 for the electrical distribution system. The maximum theoretical fault current levels shall be based on infinite bus conditions from the service entrance transformer. Actual fault current levels can be used for the pad-mounted switch rating. The extent of the analysis shall be the entire system unless the limitations given below are met. Comprehensive systems type calculations shall show maximum and minimum three phase, phase-to-phase, and phase-to-ground fault currents.

Extent of Analysis.

a. Low Fault-Levels. If the fault level (at the service transformer secondary) is 14000 A.I.C. or less for 480 V systems and 10,000 A.I.C. or less for 208 V systems, no additional documentation is necessary (assuming appropriate follow through in selection of equipment S.C. ratings).

b. High Fault-Levels. If the theoretical fault levels would exceed 50000 A.I.C., an extensive analysis shall be performed based on actual fault current levels available upstream of the service transformer. Computerized computations are preferred. The evaluation shall continue downstream until calculated fault levels are attenuated to 14000 A.I.C. or

less for 480 V systems, 10,000 A.I.C. or less for 208 V systems.

#### 1.14.4.8 Protective Coordination Analysis

A protective coordination study shall be performed to show that the power system is selectively coordinated and is fully coordinated with the upstream overcurrent devices. The protective coordination / short circuit study shall be complete and approved by the government before any changes are made to the existing equipment. The study as a minimum shall include the following:

- a. Service entrance transformer protection to the pad-mounted switch fusing.
- b. Main Service disconnect to the service entrance transformer protection.
- c. Any main breaker downstream of the main service disconnect where this main breaker is part of a switchboard, switchgear or motor control center.
- d. Any breaker downstream of the main service disconnect which has an overcurrent rating of 50% or larger of the main service disconnect rating.
- e. Any protective device used to protect a standby or emergency generator or UPS shall be coordinated with the next device in the distribution system.
- f. All ground fault relays shall be coordinated with the upstream device.
- g. The primary and secondary protective devices for an interior transformer.
- h. Any protective device connected ahead of the service entrance disconnect shall be coordinated with the upstream device.

#### 1.14.4.9 Specialized Applications

Additional engineering backup should be included to address special requirements such as accommodation of nonlinear loads, harmonics analysis, energy studies, etc.

### 1.15 FIRE PROTECTION

#### 1.15.1 DRAWINGS

Design will be an extension of the 60% submittal, incorporating all comments thereto and any revised criteria, all as specifically directed by the District Office. All conflicts, lack of specific criteria, and/or direction, inconsistencies, ambiguities, and lack of thorough understanding of the nature and scope of work shall be resolved prior to starting final design work. The fire protection plans shall show the following: sprinkler system, to include hazard of each area, area of demand, densities, riser location and detail, inspectors test connection, etc; fire detection system, to include control panels, remote annunciators, alarm notification devices, and each initiating device; fire walls; fire partitions; building separations; other fire protection features.

#### 1.15.2 DESIGN ANALYSIS

The final design analysis will be an extension of the 60% design analysis and shall be complete for every item covered in the design and will include, but not be limited to, the following:

- a. List of design criteria.
- b. Design conditions.
- c. Design calculations.
- d. Complete description of system alarm zones.



- e. Complete description of system sprinkler system.
- f. Complete description of the building fire protection features.
- g. Other pertinent information of value for future use in construction contract administration, substantiation of design methods, or permanent record shall be included.

#### 1.15.3 TECHNICAL GUIDE SPECIFICATIONS

The following UFGS guide specifications shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product and installation requirements for the facility:

13930A	Wet-Pipe Sprinkler System, Fire Protection
13851A	Fire Detection System and Alarm System, Addressable

All items identified in the specifications not required shall be marked for deletion in accordance with the requirements of Section 01332 SUBMITTALS DURING DESIGN. Those items of equipment, materials, or installation requirements that are required are not permitted to be modified or changed from that presently shown. Government approval is required for the final submittal of these guide specs.

#### 1.16 ENVIRONMENTAL PROTECTION, COMPLIANCE, AND PERMITS

##### 1.16.1 General Requirements

Any additional environmental requirements, identified after submittal of the 60% Design documents, shall be include in the 100% Environmental Protection, Compliance, and Permits Design Analysis Chapter and the Environmental Protection Plan for the project.

##### 1.16.2 Design Analysis Chapter

The Contractor shall update the chapter in the Design Analysis entitled: "ENVIRONMENTAL PROTECTION, COMPLIANCE, AND PERMITS" that was submitted at 60%. The updated chapter shall include additional summaries of environmental coordination, compliance, approvals, permits, and etc. required for the project since 60% submittals. The Contractor shall include additional documentations of the coordination, discussions, phone conversation records, and/or letters required to assure that the project is in full compliance with all Federal, State, and local environmental laws and regulations. The Contractor shall included an updated list of environmental permits, approvals, notifications, etc. that are required for the project which was submitted with the 60% submittal.

##### 1.16.3 Environmental Protection Plan

The Contractor shall prepare and submit a Final Design Environmental Protection Plan in accordance with the requirements of Section 01355 ENVIRONMENTAL PROTECTION and any additional environmental compliance plans that have been identified during the design.

##### 1.16.4 Appendix to the Environmental Protection Plan

As an Appendix to the Final Environmental Protection Plan, the Contractor shall submit copies of the completed permit applications and associated documents, notices, reviews, and/or approvals that are required for the project. Copies of all permits and/or approvals that are required for the project prior to start of construction shall be included in the Appendix. Any additional requirements and/or conditions of the permits/approvals that are required to be submitted during and/or at completion of construction shall be included in the Appendix.

PART 2 NOT USED

PART 3 NOT USED

-- End of Section --

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PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

U.S. AIR FORCE (USAF)

AFI 32-1053 Pest Management Program

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

33 CFR 328	Definitions
40 CFR 68	Chemical Accident Prevention Provisions
40 CFR 152 - 186	Pesticide Programs
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 279	Standards for the Management of Used Oil
40 CFR 302	Designation, Reportable Quantities, and Notification
40 CFR 355	Emergency Planning and Notification
49 CFR 171 - 178	Hazardous Materials Regulations

U.S. AIR FORCE ACADEMY

SPRP Spill Prevention and Response Plan

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(1996) U.S. Army Corps on Engineers Safety and Health Requirements Manual
WETLAND MANUAL	Corps of Engineers Wetlands Delineation Manual Technical Report Y-87-1

## 1.2 DEFINITIONS

### 1.2.1 Environmental Pollution and Damage

Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally and/or historically.

### 1.2.2 Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

### 1.2.3 Contractor Generated Hazardous Waste

Contractor generated hazardous waste means materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work, but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene etc.), waste thinners, excess paints, excess solvents, waste solvents, and excess pesticides, and contaminated pesticide equipment rinse water.

### 1.2.4 Installation Pest Management Coordinator

Installation Pest Management Coordinator (IPMC) is the individual officially designated by the Installation Commander to oversee the Installation Pest Management Program and the Installation Pest Management Plan.

### 1.2.5 Land Application for Discharge Water

The term "Land Application" for discharge water implies that the Contractor shall discharge water at a rate which allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" shall occur. Land Application shall be in compliance with all applicable Federal, State, and local laws and regulations.

### 1.2.6 Pesticide

Pesticide is defined as any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, or intended for use as a plant regulator, defoliant or desiccant.

### 1.2.7 Pests

The term "pests" means arthropods, birds, rodents, nematodes, fungi, bacteria, viruses, algae, snails, marine borers, snakes, weeds and other

organisms (except for human or animal disease-causing organisms) that adversely affect readiness, military operations, or the well-being of personnel and animals; attack or damage real property, supplies, equipment, or vegetation; or are otherwise undesirable.

#### 1.2.8 Surface Discharge

The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "waters of the United States" and would require a permit to discharge water from the governing agency.

#### 1.2.9 Waters of the United States

All waters which are under the jurisdiction of the Clean Water Act, as defined in 33 CFR 328.

#### 1.2.10 Wetlands

Wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, and bogs. Official determination of whether or not an area is classified as a wetland must be done in accordance with WETLAND MANUAL.

### 1.3 GENERAL REQUIREMENTS

The Contractor shall minimize environmental pollution and damage that may occur as the result of construction operations. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of this contract. The Contractor shall comply with all applicable environmental Federal, State, and local laws and regulations. The Contractor shall be responsible for any delays resulting from failure to comply with environmental laws and regulations.

#### 1.4 SUBCONTRACTORS

The Contractor shall ensure compliance with this section by subcontractors.

#### 1.5 PAYMENT

No separate payment will be made for work covered under this section. The Contractor shall be responsible for payment of fees associated with environmental permits, application, and/or notices obtained by the Contractor. All costs associated with this section shall be included in the contract price. The Contractor shall be responsible for payment of all fines/fees for violation or non-compliance with Federal, State, Regional and local laws and regulations.

#### 1.6 CERTIFICATION REQUIREMENTS

An environmental agency may require design and construction documents to be certified by a Professional Engineer (PE) registered in the State of Colorado. The Contractor shall comply with the certification requirements of the environmental regulatory agencies.

#### 1.7 ENVIRONMENTAL COORDINATION, PERMITS, NOTICES, REVIEWS AND/OR APPROVALS

The Contractor shall be responsible for contacting the appropriate Federal, State, Regional, and local environmental agencies to identify all required environmental permits (construction and operating), notices, reviews, and approvals required for the project. Once the requirements are identified, the Contractor shall be responsible for coordinating the requirements with USAF Academy's Environmental Flight and the Contracting Officer in regard to implementation for a Federal Facility project. The Contractor shall ensure that all coordination, permits, notices, reviews and/or approvals are completed and submitted with each applicable phase of the design. Prior to construction starting for any phase, the Contractor shall assure that all permits and/or approvals are received and copies are submitted to the Contracting Officer. The Contractor shall be responsible for any contract delays resulting from failure to obtain environmental permits, notices, reviews and/or approvals when required.

##### 1.7.1 Applications, Supporting Documents, and Fees

The Contractor shall obtain and complete all environmental permit applications and notices including any documents required for a modification for an existing permit held by the Facility. The Contractor is responsible for preparing all supporting documents, including but not limited to engineering reports, emission surveys, diagrams, pollutant load calculations, etc. If, in lieu of permits, the governing agency requires review and approval of the design, the Contractor shall submit and obtain approval of the design and associated documents. The Contractor shall be responsible for all fees associated with the permits, applications, reviews, approvals, and notices.

##### 1.7.2 Control Tower Project's Environmental Permits, Notices, Reviews, and/or Approvals

The following is a listing of permits, notices, reviews, and/or approvals which **may be** required for this project. This listing and requirements are not to be considered all-inclusive by the Contractor, but is provided as information that may be used in successfully accomplishing the environmental compliances.

- a. In the State of Colorado, **EPA** has authority for the National Pollutant Discharge Elimination System (NPDES) program on **Federal Facilities**. **If** construction activities results in disturbance of 5 acres of land or more, coverage under the EPA Storm Water General Permit For Construction Activities (Permit No. COR10\*##F) is required. The Contractor and the Omaha District Corps of Engineers shall be co-permittees. The Contractor shall be responsible for editing and applying Specification Section 01565 NPDES PERMIT REQUIREMENTS FOR STORM WATER DISCHARGES FROM CONSTRUCTION SITES and submittal requirements in Section 01338, 100 PERCENT DESIGN REQUIREMENTS.
- b. A State of Colorado Air Pollution Emission Notice (APEN) for Fugitive Dust Permit for Land Development is required if construction disturbs surface areas of more than 25 contiguous acres or if surface areas of more than 1 acre are to remain disturbed more than six months. The Contractor shall be responsible for obtaining the State of Colorado Land Development



(Fugitive Dust) permit prior to construction commencing. The State of Colorado may take a **maximum of 60-days** to review and issue the permit. The Contractor shall be responsible for completing and submitting the Air Pollutant Emission Notice (APEN)-and-Application for Construction permit including the Land Development-Fugitive Dust Control Plan, Grading Plan, and the Notice of Start-up. The Notice of Start-up is required to be submitted a **minimum of 30 days** prior to starting work on the project site but may be submitted with the APEN. A copy of the Fugitive Dust permit and Notice of Start-up shall be submitted to the Academy AFB Environmental Flight, Air Quality through the Contracting Officer prior to construction starting. If any of the information that was submitted is modified, the Contractor shall be responsible for coordinating the modification with the Contracting Officer and the State of Colorado. The Contractor shall not incorporate the modifications until receiving approval from the State of Colorado and the Contracting Officer. The Contractor is responsible for payment of all fees associated with the permit.

- c. An El Paso County Construction Activities Permit will be required **instead** of the State of Colorado Fugitive Dust Permit, **if** the length of land disturbance will be greater than 1 acre but less than 25 acres **and** will not exceed six months in duration.
- d. The Colorado Department of Public Health and Environment (CDPHE), Air Quality Division, may require an Air Pollutant Emission Notice (APEN) and a Permit-to-Construct for a new stationary source emitting an air pollutant. The USAF Academy has a State of Colorado Synthetic Minor Air Permit. The Contractor shall review the State of Colorado Air Quality laws and regulations for applicability of an APEN and/or Permit-to-Construct requirements and shall coordinate the requirements and submittals with USAF Academy's Environmental Flight, Air Quality Section, and the Contracting Officer.

## 1.8 ENVIRONMENTAL PROTECTION PLAN

During the initial design phase, the Contractor shall submit an Environmental Protection Plan for compliance review and acceptance by the Contracting Officer. For each additional submittal phases, the plan shall be updated and submitted for compliance review and acceptance by the Contracting Officer. Prior to construction, the Contractor shall meet with the Contracting Officer for the purpose of discussing the implementation of the environmental plan, possible subsequent additions and revisions to the plan including any reporting requirements, and methods for administration of the Contractor's environmental plans. The Contractor shall maintain a current version of the Environmental Protection Plan on site for review by interested parties.

### 1.8.1 Compliance

No requirement in this Section shall be construed as relieving the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During Construction, the Contractor shall be responsible for identifying, submitting for compliance review, and implementing any additional requirements to be included in the Environmental Protection Plan.

### 1.8.2 Contents

The environmental protection plan shall include, but shall not be limited to, the following:

- a. Name(s) of person(s) within the Contractor's organization who is(are) responsible for ensuring adherence to the Environmental Protection Plan.
- b. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site, if applicable.
- c. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.
- d. Description of the Contractor's environmental protection personnel training program.
- e. An erosion and sediment control plan which identifies the type and location of the erosion and sediment controls to be provided. The plan shall include monitoring and reporting requirements to assure that the control measures are in compliance with the erosion and sediment control plan, Federal, State, and local laws and regulations. The plan shall comply with the USAF Academy's Storm Water Pollution Prevention Plan (SWPPP); a copy can be reviewed at the USAF Academy's Environmental Flight office. A Storm Water Pollution Prevention Plan (SWPPP) may be substituted for this plan.
- f. Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on the site.
- g. Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plan shall include measures to minimize the amount of mud transported onto paved public roads by vehicles or runoff.
- h. Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas including methods for protection of features to be preserved within authorized work areas.
- i. Drawing showing the location of borrow areas.
- j. The Spill Control plan shall include the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by 40 CFR 68, 40 CFR 302, 40 CFR 355, and/or regulated under State or Local laws and regulations. The Spill Control Plan supplements the requirements of EM 385-1-1 and the USAF Academy's Spill Prevention and Response Plan (SPRP). This plan shall include as a minimum:
  1. The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual shall immediately notify the Contracting Officer, USAF Academy Fire Department, and USAF Academy Environmental Flight in addition to the legally required Federal, State, and local reporting channels (including the

National Response Center 1-800-424-8802) if a reportable quantity is released to the environment. The plan shall contain a list of the required reporting channels and telephone numbers.

2. The name and qualifications of the individual who will be responsible for implementing and supervising the containment and cleanup.

3. Training requirements for Contractor's personnel and methods of accomplishing the training.

4. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.

5. The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency.

6. The methods and procedures to be used for expeditious contaminant cleanup.

k. A non-hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris. The plan shall include schedules for disposal. The Contractor shall identify any subcontractors responsible for the transportation and disposal of solid waste. Licenses or permits shall be submitted for solid waste disposal sites that are not a commercial operating facility. Evidence of the disposal facility's acceptance of the solid waste shall be attached to this plan during the construction. The Contractor shall attach a copy of each of the Non-hazardous Solid Waste Diversion Reports to the disposal plan. The report shall be submitted on the first working day after the first quarter that non-hazardous solid waste has been disposed and/or diverted and shall be for the previous quarter (e.g. the first working day of January, April, July, and October). The report shall indicate the total amount of waste generated and total amount of waste diverted in cubic meters or tons along with the percent that was diverted.

l. A recycling and solid waste minimization plan with a list of measures to reduce consumption of energy and natural resources. The plan shall detail the Contractor's actions to comply with and to participate in Federal, State, Regional, and local government sponsored recycling programs to reduce the volume of solid waste at the source.

m. An air pollution control plan detailing provisions to assure that dust, debris, materials, trash, etc., do not become air borne and travel off the project site. If a State of Colorado Fugitive Dust Permit or an El Paso County Land Development Permit is required, a copy of the Land Disturbance Dust Control Plan which was submitted to the State of Colorado or to El Paso County for the permit shall be included as an attachment to the plan

n. A contaminant prevention plan that: identifies potentially hazardous substances to be used on the job site; identifies the intended actions to prevent introduction of such materials into the air, water, or ground; and details provisions for compliance with Federal, State, and local laws and regulations for storage and handling

of these materials. In accordance with EM 385-1-1, a copy of the Material Safety Data Sheets (MSDS) and the maximum quantity of each hazardous material to be on site at any given time shall be included in the contaminant prevention plan. As new hazardous materials are brought on site or removed from the site, the plan shall be updated. The Contractor shall identify any "extremely hazardous substances" (40 CFR 355, Appendix A and B) to be used during the execution of the contract and indicate if the amount of the chemical exceeds the execution of the threshold planning quantity. The Contractor shall furnish a copy of the initial and all updated contaminant prevention plans including each MSDS and quantities to the USAF Academy's Environmental Flight a minimum of ten days prior to commencement of work on site.

o. A waste water management plan that identifies the methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines. If a settling/retention pond is required, the plan shall include the design of the pond including drawings, removal plan, and testing requirements for possible pollutants. If land application will be the method of disposal for the waste water, the plan shall include a sketch showing the location for land application along with a description of the pretreatment methods to be implemented. If surface discharge will be the method of disposal, a copy of the permit and associated documents shall be included as an attachment prior to discharging the waste water. If disposal is to a sanitary sewer, the plan shall include documentation that the Waste Water Treatment Plant Operator has approved the flow rate, volume, and type of discharge.

p. A historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on the project site: and/or identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be on site or in the area are discovered during design or construction. The plan shall include methods to assure the protection of known or discovered resources and shall identify lines of communication between Contractor personnel and the Contracting Officer.

q. If applicable, a pesticide treatment plan shall be included and updated, as information becomes available. The plan shall include: sequence of treatment, dates, times, locations, pesticide trade name, EPA registration numbers, authorized uses, chemical composition, formulation, original and applied concentration, application rates of active ingredient (i.e. pounds of active ingredient applied), equipment used for application and calibration of equipment. The Contractor is responsible for Federal, State, Regional and Local pest management record keeping and reporting requirements as well as any additional Installation specific requirements. The Contractor shall follow AFI 32-1053 Sections 3.4.13 and 3.4.14 for data required to be reported to the Installation.

#### 1.8.3 Appendix

Copies of all environmental permits, permit application packages, approvals to construct, notifications, certifications, reports, and termination

documents shall be attached, as an appendix, to the Environmental Protection Plan.

#### 1.9 PROTECTION FEATURES

This paragraph supplements the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS. Prior to start of any on site construction activities, the Contractor and the Contracting Officer shall make a joint condition survey. Immediately following the survey, the Contractor shall prepare a brief report including a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. This survey report shall be signed by both the Contractor and the Contracting Officer upon mutual agreement as to its accuracy and completeness. The Contractor shall protect those environmental features included in the survey report and any indicated on the drawings, regardless of interference which their preservation may cause to the Contractor's work under the contract.

#### 1.10 ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS

Any deviations, requested by the Contractor, from the drawings, plans and specifications which may have an environmental impact will be subject to approval by the Contracting Officer and may require an extended review, processing, and approval time. The Contracting Officer reserves the right to disapprove alternate methods, even if they are more cost effective, if the Contracting Officer determines that the proposed alternate method will have an adverse environmental impact.

#### 1.11 NOTIFICATION

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with Federal, State or local environmental laws or regulations, permits, and other elements of the Contractor's Environmental Protection plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of the proposed corrective action and take such action when approved by the Contracting Officer. The Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or equitable adjustments allowed to the Contractor for any such suspensions. This is in addition to any other actions the Contracting Officer may take under the contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

#### PART 2 PRODUCTS (NOT USED)

#### PART 3 EXECUTION

##### 3.1 LAND RESOURCES

The Contractor shall confine all activities to areas defined by the drawings and specifications. Prior to the beginning of any construction, the Contractor shall identify any land resources to be preserved within the work area. Except in areas indicated on the drawings or specified to be cleared, the Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land

forms without approval. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. The Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Stone, soil, or other materials displaced into uncleared areas shall be removed by the Contractor.

#### 3.1.1 Work Area Limits

Prior to commencing construction activities, the Contractor shall mark the areas that need not be disturbed under this contract. Isolated areas within the general work area which are not to be disturbed shall be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, any markers shall be visible in the dark. The Contractor's personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

#### 3.1.2 Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques. The Contractor shall restore landscape features damaged or destroyed during construction operations outside the limits of the approved work area.

#### 3.1.3 Erosion and Sediment Controls

The Contractor shall be responsible for providing erosion and sediment control measures in accordance with Federal, State, and local laws and regulations. The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of the Contractor's construction activities. The area of bare soil exposed at any one time by construction operations should be kept to a minimum. The Contractor shall construct or install temporary and permanent erosion and sediment control best management practices (BMPs). BMPs may include, but not be limited to, vegetation cover, stream bank stabilization, slope stabilization, silt fences, construction of terraces, interceptor channels, sediment traps, inlet and outfall protection, diversion channels, and sedimentation basins. Any temporary measures shall be removed after the area has been stabilized.

#### 3.1.4 Contractor Facilities and Work Areas

The Contractor's field offices, staging areas, stockpile storage, and temporary buildings shall be placed in areas designated on the drawings or as directed by the Contracting Officer. Temporary movement or relocation of Contractor facilities shall be made only when approved. Erosion and sediment controls shall be provided for on-site borrow and spoil areas to prevent sediment from entering nearby waters. Temporary excavation and embankments for plant and/or work areas shall be controlled to protect adjacent areas.

### 3.2 WATER RESOURCES

The Contractor shall monitor construction activities to prevent pollution of surface and ground waters. Toxic or hazardous chemicals shall not be applied to soil or vegetation unless otherwise indicated. All water areas

affected by construction activities shall be monitored by the Contractor. For construction activities immediately adjacent to impaired surface waters, the Contractor shall be capable of quantifying sediment or pollutant loading to that surface water when required by State or Federally issued Clean Water Act permits.

### 3.2.1 Wetlands

The Contractor shall not enter, disturb, destroy, or allow discharge of contaminants into any wetlands.

## 3.3 AIR RESOURCES

Equipment operation, activities, or processes performed by the Contractor shall be in accordance with all Federal and State air emission and performance laws and standards.

### 3.3.1 Particulates

Dust particles; aerosols and gaseous by-products from construction activities; and processing and preparation of materials, such as from asphaltic batch plants; shall be controlled at all times, including weekends, holidays and hours when work is not in progress. The Contractor shall maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the Federal, State, and local air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. The Contractor must have sufficient, competent equipment available to accomplish these tasks. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs. The Contractor shall comply with all State and local visibility regulations.

### 3.3.2 Odors

Odors from construction activities shall be controlled at all times. The odors shall not cause a health hazard and shall be in compliance with State regulations and/or local ordinances.

### 3.3.3 Sound Intrusions

The Contractor shall keep construction activities under surveillance and control to minimize environment damage by noise.

### 3.3.4 Burning

Burning shall be prohibited on the Government premises.

## 3.4 CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL

Disposal of wastes shall be as directed below, unless otherwise specified in other sections and/or shown on the drawings.

### 3.4.1 Solid Wastes

Solid wastes (excluding clearing debris) shall be placed in containers which are emptied on a regular schedule. Handling, storage, and disposal shall be conducted to prevent contamination. Segregation measures shall be employed so that no hazardous or toxic waste will become co-mingled with solid waste. The Contractor shall transport solid waste off Government property and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal. A Subtitle D RCRA permitted landfill shall be the minimum acceptable off-site solid waste disposal option. The Contractor shall verify that the selected transporters and disposal facilities have the necessary permits and licenses to operate.

#### 3.4.2 Chemicals and Chemical Wastes

Chemicals shall be dispensed ensuring no spillage to the ground or water. Periodic inspections of dispensing areas to identify leakage and initiate corrective action shall be performed and documented. This documentation will be periodically reviewed by the Government. Chemical waste shall be collected in corrosion resistant, compatible containers. Collection drums shall be monitored and removed to a staging or storage area when contents are within 150 mm of the top. Wastes shall be classified, managed, stored, and disposed of in accordance with Federal, State, and local laws and regulations.

#### 3.4.3 Contractor Generated Hazardous Wastes/Excess Hazardous Materials

Hazardous wastes are defined in 40 CFR 261, or are as defined by applicable State and local regulations. Hazardous materials are defined in 49 CFR 171 - 178. The Contractor shall, at a minimum, manage and store hazardous waste in compliance with 40 CFR 262 and shall manage and store hazardous waste in accordance with the Installation hazardous waste management plan. The Contractor shall take sufficient measures to prevent spillage of hazardous and toxic materials during dispensing. The Contractor shall segregate hazardous waste from other materials and wastes, shall protect it from the weather by placing it in a safe covered location, and shall take precautionary measures such as berming or other appropriate measures against accidental spillage. The Contractor shall be responsible for storage, describing, packaging, labeling, marking, and placarding of hazardous waste and hazardous material in accordance with 49 CFR 171 - 178, State, and local laws and regulations. Contractor shall establish an initial accumulation point (IAP) and shall accumulate no more than 55 gallons of hazardous waste, or one quart of acutely hazardous waste ("P"-listed waste as defined in Federal or State regulations). The Contractor shall transport Contractor generated hazardous waste off Government property within 60 days in accordance with the Environmental Protection Agency and the Department of Transportation laws and regulations. A minimum of three working days prior to transporting hazardous waste off site, the Contractor shall coordinate with the Contracting Officer and the USAF Academy's Environmental Flight. The Contractor shall dispose of hazardous waste in compliance with Federal, State and local laws and regulations. Spills of hazardous or toxic materials shall be immediately reported to the Contracting Officer. Cleanup and cleanup costs due to spills shall be the Contractor's responsibility. The disposition of Contractor generated hazardous waste and excess hazardous materials are the Contractor's responsibility.

#### 3.4.4 Fuel and Lubricants

Storage, fueling and lubrication of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spill and



evaporation. Fuel, lubricants and oil shall be managed and stored in accordance with all Federal, State, Regional, and local laws and regulations. Used lubricants and used oil to be discarded shall be stored in marked corrosion-resistant containers and recycled or disposed in accordance with 40 CFR 279, State, and local laws and regulations. There shall be no storage of fuel on the project site. Fuel must be brought to the project site each day that work is performed.

#### 3.4.5 Waste Water

Disposal of waste water shall be as specified below.

- a. Waste water from construction activities, such as on site material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, forms, etc. shall not be allowed to enter water ways or to be discharged prior to being treated to remove pollutants. The Contractor shall dispose of the construction related waste water off-Government property in accordance with all Federal, State, Regional and Local laws and regulations.
- b. Ground water shall be land applied in accordance with all Federal, State, Regional, and Local laws and regulations for pumping and land applying ground water. Although the State of Colorado does not have jurisdiction for the NPDES program on Federal Facilities, the Contractor shall assure that the State of Colorado's Water Quality laws and regulations are not violated when pumping and discharging water.
- c. Water generated from the flushing of lines after disinfection or disinfection in conjunction with hydrostatic testing shall be land applied in accordance with all Federal, State, and local laws and regulations for land application or discharged into the sanitary sewer with prior approval and/or notification to the Waste Water Treatment Plant's Operator.

#### 3.5 RECYCLING AND WASTE MINIMIZATION

The Contractor shall participate in State and local government sponsored recycling programs. The Contractor is further encouraged to minimize solid waste generation throughout the duration of the project. The Contractor shall be responsible for coordinating with the USAF Academy Environmental Flight for possible participation in, but not limited to, the following recycling and waste minimization activities to divert non-hazardous solid waste.

- (1) Cardboard and paper products may be recycled through the USAF Academy
- (2) Asphalt
- (3) Wood scraps that are free of contaminants may be recycled to the compost area on the USAF Academy
- (4) Scrap metal that is free of contaminants

#### 3.6 NON-HAZARDOUS SOLID WASTE DIVERSION REPORT

The Contractor shall maintain an inventory of non-hazardous solid waste

diversion and disposal of construction and demolition debris. The Contractor shall submit a report to USAF Academy's Environmental Flight through the Contracting Officer on the first working day after each fiscal year quarter, starting the first quarter that non-hazardous solid waste has been generated. The following shall be included in the report:

- a. Construction and Demolition (C&D) Debris Disposed = \_\_\_\_\_ in cubic meters, as appropriate.
- b. Construction and Demolition (C&D) Debris Recycled/Diverted = \_\_\_\_\_ in cubic meters, as appropriate.
- c. Total C&D Debris Generated = \_\_\_\_\_ in cubic meters, as appropriate.
- d. Waste Sent to Waste-To-Energy Incineration Plant (This amount should not be included in the recycled amount) = \_\_\_\_\_ in cubic meters, as appropriate.

### 3.7 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

If during excavation or other construction activities any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found, all activities that may damage or alter such resources shall be temporarily suspended. Resources covered by this paragraph include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, the Contractor shall immediately notify the Contracting Officer so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. The Contractor shall cease all activities that may result in impact to or the destruction of these resources. The Contractor shall secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources.

### 3.8 BIOLOGICAL RESOURCES

The Contractor shall minimize interference with, disturbance to, and damage to fish, wildlife, and plants including their habitat. The Contractor shall be responsible for the protection of threatened and endangered animal and plant species including their habitat in accordance with Federal, State, Regional, and local laws and regulations.

#### 3.8.1 Preble's Meadow Jumping Mouse (PMJM)

The Federally Threatened Preble's Meadow Jumping Mouse occurs on the Air Force Academy (AFA). The AFA has a Conservation Agreement and Plan with the US Fish and Wildlife Service (USFWS) to protect PMJM's habitat and mitigate any adverse impacts to the habitat. On the AFA, the PMJM habitat is generally defined as riparian habitat (woody vegetated streams and drainage ways) and upland areas within 300-feet of the 100 year floodplain of a stream. Although the project site is not located in these areas and the PMJM and it's habitat are not likely to be affected, the Contractor shall be responsible for notifying the USFWS Colorado Ecological Services Field Office or the USFWS Law Enforcement Office and the AFA Natural Resources office if a PMJM (dead, injured, or hibernating) is located during construction.

### 3.9 INTEGRATED PEST MANAGEMENT

In order to minimize impacts to existing fauna and flora, the Contractor, through the Contracting Officer, shall coordinate with the Installation Pest Management Coordinator (IPMC) at the earliest possible time prior to pesticide application. The Contractor shall discuss integrated pest management strategies with the IPMC and receive concurrence from the IPMC through the COR prior to the application of any pesticide associated with these specifications. Installation Pest Management personnel shall be given the opportunity to be present at all meetings concerning treatment measures for pest or disease control and during application of the pesticide. The use and management of pesticides are regulated under 40 CFR 152 - 186.

#### 3.9.1 Pesticide Delivery and Storage

Pesticides shall be delivered to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses. Pesticides shall be stored according to manufacturer's instructions and under lock and key when unattended.

#### 3.9.2 Qualifications

For the application of pesticides, the Contractor shall use the services of a subcontractor whose principal business is pest control. The subcontractor shall be licensed and certified in the state where the work is to be performed.

#### 3.9.3 Pesticide Handling Requirements

The Contractor shall formulate, treat with, and dispose of pesticides and associated containers in accordance with label directions and shall use the clothing and personal protective equipment specified on the labeling for use during all phases of the application. Material Safety Data Sheets (MSDS) shall be available for all pesticide products.

#### 3.9.4 Application

Pesticides shall be applied by a State Certified Pesticide Applicator in accordance with EPA label restrictions and recommendation. The Certified Applicator shall wear clothing and personal protective equipment as specified on the pesticide label. Water used for formulating shall only come from locations designated by the Contracting Officer. The Contractor shall not allow the equipment to overflow. Prior to application of pesticide, all equipment shall be inspected for leaks, clogging, wear, or damage and shall be repaired prior to being used.

### 3.10 PREVIOUSLY USED EQUIPMENT

The Contractor shall clean all previously used construction equipment prior to bringing it onto the project site. The Contractor shall ensure that the equipment is free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. The Contractor shall consult with the USDA jurisdictional office for additional cleaning requirements.

### 3.11 MAINTENANCE OF POLLUTION FACILITIES

The Contractor shall maintain permanent and temporary pollution control facilities and devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

### 3.12 MILITARY MUNITIONS

In the event the Contractor discovers or uncovers military munitions as defined in 40 CFR 260, the Contractor shall immediately stop work in that area and immediately inform the Contracting Officer.

### 3.13 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel shall be trained in all phases of environmental protection and pollution control. The Contractor shall conduct environmental protection/pollution control meetings for all Contractor personnel prior to commencing construction activities. Additional meetings shall be conducted for new personnel and when site conditions change. The training and meeting agenda shall include: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, wetlands, and endangered species and their habitat that are known to be in the area.

### 3.14 POST CONSTRUCTION CLEANUP

The Contractor shall clean up all areas used for construction in accordance with Contract Clause: "Cleaning Up". The Contractor shall, unless otherwise instructed in writing by the Contracting Officer, obliterate all signs of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. The disturbed area shall be graded, filled and the entire area seeded unless otherwise indicated.

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SECTION 01400

SPECIAL SAFETY REQUIREMENTS

**05/00 Rev 09/01**

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SECTION 01400  
SPECIAL SAFETY REQUIREMENTS  
**05/00 Rev 09/01**

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1926                                      Safety and Health Regulations for  
Construction

ENGINEERING MANUALS (EM)

EM 385-1-1                                      (1996 and Changes) Safety and Health  
Requirements Manual

1.2 SUMMARY

1.2.1 General

This section provides guidelines for preparation of accident prevention plans, and to implement the accident prevention clause (this specification) and EM 385-1-1, Safety and Health Requirements Manual. The U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1 is available from U.S. Government bookstores operated by the Government Printing Office [and a copy is included on the CD-ROM issued with this solicitation. Changes to EM 385-1-1 applicable to this contract include only those revisions posted at the following website (all revisions up to the time this solicitation is issued):  
[http://www.hq.usace.army.mil/soh/hqusace\\_soh.htm](http://www.hq.usace.army.mil/soh/hqusace_soh.htm) ("Changes to EM"). U.S. Government bookstores are located in most major cities including Milwaukee, Chicago, Kansas City, Denver, and Pueblo, Colorado.

1.2.2 Not Used

1.3 PRECONSTRUCTION CONFERENCE

See Contract Clause "PRECONSTRUCTION CONFERENCE". A preconstruction conference will be scheduled prior to beginning of site work. Requirements relative to planning and administration of the overall safety program will be discussed.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office

that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Accident Prevention Plan; G-RE

The written site-specific Accident Prevention Plan.

1.5 ACCIDENT PREVENTION PLAN

The Contractor shall submit, prior to the start of on site construction activity, a proposed accident prevention plan which shall be the accident prevention policy to be followed by all of the Contractor's and subcontractor's personnel and supervisory staff during performance of the work.

1.5.1 Requirements

The proposed plan shall be developed after a careful analysis of the work involved and shall be tailored specifically to the conditions of this project. The Contractor's accident prevention plan shall contain, as a minimum, the following general information or procedures for the activity indicated. The Contractor shall submit his plan for review and acceptance prior to commencing work.

1.5.1.1 Responsible Individual(s)

The Contractor shall designate an onsite employee as the individual responsible for insuring the accident prevention plan is implemented and enforced.

1.5.1.2 Subcontractor Supervision

Explain procedures to assure that subcontractor(s) fully comply with the accident prevention plan.

1.5.1.3 Indoctrination of New Employees

The plan shall include provisions for advising workers of the purpose of the accident prevention plan, specific hazards on the job and precautions to be taken, emergency procedures, information concerning tool box safety meetings, required protective equipment, cleanup rules and location of company safety rules (posting or handout).

1.5.1.4 Tool Box Safety Meetings

Hold weekly "Tool Box" safety meetings. Timely safety subjects shall be determined by a responsible individual. Employees will be informed of time, location, who will conduct, and subject. Identify procedures for including subcontractors. The Contractor shall provide a copy of the Weekly Tool Box Meeting and Monthly Supervisor's Safety Meeting to the Contracting Officer.

1.5.1.5 Fire Prevention and Protection

Identify source of fire protection. Insure adequate fire extinguishers, water barrels, or other fire-fighting equipment is located on site. Explain prevention activities to include storage areas and special hazards

such as welding and use of flammable liquids, and other special hazards.

#### 1.5.1.6 Housekeeping

Daily cleanup of all debris and waste materials is required. Adequate disposal containers should be placed strategically around the site. Debris shall be removed on a regular basis. Explain procedures that include use of barrels, dumpsters, trash chutes, etc.

#### 1.5.1.7 Mechanical Equipment Inspection

All mechanical equipment (trucks, cranes, forklifts, backhoes, graders, etc.) shall be inspected prior to use and at fixed intervals throughout the life of the contract. Explain how inspections will be accomplished (frequency, by whom, and records to be kept).

#### 1.5.1.8 First Aid and Medical Facilities

First aid facilities shall be made available on the job site. Arrangements for emergency medical attention shall be made prior to start of work. All emergency numbers (doctor, hospital, ambulance, fire department) shall be posted at the project superintendent's office.

#### 1.5.1.9 Sanitation

Include provisions for toilet facilities, drinking water and washing facilities. A sufficient number of toilet facilities as specified in EM 385-1-1 shall be provided unless permission is granted to use existing facilities (portable chemical are authorized). Insure safe drinking water and individual cups are available. For the projects where corrosive or toxic materials are used, separate washing facilities are required.

#### 1.5.1.10 Safety Promotions

The Contractor shall promote accident prevention. Identify method (posters, awards etc.).

#### 1.5.1.11 Accident Reporting

All accidents (employee injuries, vehicle, building, or equipment damage etc.) regardless of their severity, shall be reported to the onsite government representative or to the area engineer, who in turn will advise the Contractor of forms to be submitted and timeframes.

#### 1.5.1.12 Job Hazard Analysis

When job situations change and it is necessary to alter safety requirements, a Job Hazard Analysis will be accomplished, documented, and added as an addendum to the Accident Prevention Plan. Each Job Hazard Analysis shall include, but not be limited to, a description of the work, probable hazards related to that work and positive precautionary measures to be taken to reduce or eliminate each hazard. An example of changing situations may be new subcontractors performing work such as earth moving, trenching, concrete work, roofing, electrical, masonry etc. The onsite government representative will determine the format and amount of detail required of the written plan.

### 1.6 RADIOLOGICAL EQUIPMENT



In addition to any applicable Nuclear Regulatory Commission, state, local, or other federal licenses or permits, and in accordance with requirements of EM 385-1-1, Safety and Health Requirement Manual, the Contractor is required to obtain a service permit to use, store, operate, or handle a radiation producing machine or radioactive materials on a Department of Defense (DOD) Installation. The service permit shall be obtained from the appropriate U.S. Army or U.S. Air Force Command through the Contracting Officer's representative. The Contractor should notify the Contracting Officer during the prework conference if a radiation producing device will be utilized on a DOD Installation in order to determine the permit application requirements, and allow a lead time of 45 days for obtaining a permit.

#### 1.7 EXCAVATION AND TRENCHING

The standards for excavation and trenching are outlined in 29 CFR 1926, Subpart P. These standards shall be followed in addition to those outlined in EM 385-1-1.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

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SECTION 01415

METRIC MEASUREMENTS

**09/01**

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SECTION 01415

METRIC MEASUREMENTS

**09/01**

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 380	(1993) Practice for Use of the International System of Units (SI)
ASTM E 621	(1994; R 1999e1) Practice for Use of Metric (SI) Units in Building Design and Construction

1.2 GENERAL

This project includes metric units of measurements. The metric units used are the International System of Units (SI) developed and maintained by the General Conference on Weights and Measures (CGPM); the name International System of Units and the international abbreviation SI were adopted by the 11th CGPM in 1960. A number of circumstances require that both metric SI units and English inch-pound (I-P) units be included in a section of the specifications. When both metric and I-P measurements are included, the section may contain measurements for products that are manufactured to I-P dimensions and then expressed in mathematically converted metric value (soft metric) or, it may contain measurements for products that are manufactured to an industry recognized rounded metric (hard metric) dimensions but are allowed to be substituted by I-P products to comply with the law. Dual measurements are also included to indicate industry and/or Government standards, test values or other controlling factors, such as the code requirements where I-P values are needed for clarity or to trace back to the referenced standards, test values or codes.

1.3 USE OF MEASUREMENTS

Measurements shall be either in SI or I-P units as indicated, except for soft metric measurements or as otherwise authorized. When only SI or I-P measurements are specified for a product, the product shall be procured in the specified units (SI or I-P) unless otherwise authorized by the Contracting Officer. The Contractor shall be responsible for all associated labor and materials when authorized to substitute one system of units for another and for the final assembly and performance of the specified work and/or products.

1.3.1 Hard Metric

A hard metric measurement is indicated by an SI value with no expressed correlation to an I-P value. Hard metric measurements are often used for field data such as distance from one point to another or distance above the floor. Products are considered to be hard metric when they are

manufactured to metric dimensions or have an industry recognized metric designation.

#### 1.3.2 Soft Metric

- a. A soft metric measurement is indicated by an SI value which is a mathematical conversion of the I-P value shown in parentheses (e.g. 38.1 mm (1-1/2 inches)). Soft metric measurements are used for measurements pertaining to products, test values, and other situations where the I-P units are the standard for manufacture, verification, or other controlling factor. The I-P value shall govern while the metric measurement is provided for information.
- b. A soft metric measurement is also indicated for products that are manufactured in industry designated metric dimensions but are required by law to allow substitute I-P products. These measurements are indicated by a manufacturing hard metric product dimension followed by the substitute I-P equivalent value in parentheses (e.g., 190 x 190 x 390 mm (7-5/8 x 7-5/8 x 15-5/8 inches)).

#### 1.3.3 Neutral

A neutral measurement is indicated by an identifier which has no expressed relation to either an SI or an I-P value (e.g., American Wire Gage (AWG) which indicates thickness but in itself is neither SI nor I-P).

#### 1.4 COORDINATION

Discrepancies, such as mismatches or product unavailability, arising from use of both metric and non-metric measurements and discrepancies between the measurements in the specifications and the measurements in the drawings shall be brought to the attention of the Contracting Officer for resolution.

#### 1.5 RELATIONSHIP TO SUBMITTALS

Submittals for Government approval or for information only shall cover the SI or I-P products actually being furnished for the project. The Contractor shall submit the required drawings and calculations in the same units used in the contract documents describing the product or requirement unless otherwise instructed or approved. The Contractor shall use ASTM E 380 and ASTM E 621 as the basis for establishing metric measurements required to be used in submittals.

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SECTION 01451A

CONTRACTOR QUALITY CONTROL  
**07/01; Omaha Rev. 10/01**

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3740	(2001) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E 329	(2000b) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Pricing Schedule.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The site project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract. The site project superintendent in this context shall be the highest level manager responsible for the overall construction activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Contracting Officer, and shall be responsible for all construction and construction related activities at the site.



### 3.2 QUALITY CONTROL PLAN

The Contractor shall furnish for review by the Government, not later than 10 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 30 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

#### 3.2.1 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

- a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project superintendent.
- b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.
- c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Government.
- d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01330 SUBMITTAL PROCEDURES.
- e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by the Contracting Officer.)
- f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.
- g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified

deficiencies have been corrected.

- h. Reporting procedures, including proposed reporting formats.
- i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

### 3.2.2 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

### 3.2.3 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

## 3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the CQC Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 10 calendar days prior to the Coordination Meeting.

During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Contractor and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

## 3.4 QUALITY CONTROL ORGANIZATION

### 3.4.1 Personnel Requirements

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure safety and contract compliance. The Safety and Health Manager shall receive direction and authority from the CQC System Manager and shall serve as a member of the CQC staff. Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC organization. The

Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer. The Contractor shall provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Complete records of all letters, material submittals, show drawing submittals, schedules and all other project documentation shall be promptly furnished to the CQC organization by the Contractor. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

#### 3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a construction person with a minimum of 5 years in related work. This CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. The CQC System Manager shall be assigned no other duties .

An alternate for the CQC System Manager shall be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager.

#### 3.4.3 CQC Personnel

A staff shall be maintained under the direction of the CQC system manager to perform all QC activities. The staff must be of sufficient size to ensure adequate QC coverage of all work phases, work shifts, and work crews involved in the construction. These personnel may perform other duties, but must be fully qualified by experience and technical training to perform their assigned QC responsibilities and must be allowed sufficient time to carry out these responsibilities. The QC plan will clearly state the duties and responsibilities of each staff member.

#### 3.4.4 Additional Requirement

In addition to the above experience and/or education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management For Contractors". This course is periodically offered at each of the four area offices in the Omaha District according to the following revolving training schedule:

<u>Badger Area</u>	First Session	Between 15 & 25 April
	Second Session	Between 15 & 25 October
Point of Contact	Roy Brewer	(608) 388-4780
<u>Black Hills Area</u>	First Session	Between 1 & 10 March
	Second Session	Between 1 & 10 September
Point of Contact	Dwight Pochant	(605) 923-2983
<u>Fort Crook Area</u>	First Session	Between 15 & 25 January
	Second Session	Between 15 & 25 July
Point of Contact	Al Kreisler	(402) 293-2540

<u>Rocky Mountain</u>	First Session	Between 1 & 10 June
	Second Session	Between 1 & 10 December
Point of Contact	Paul Jendzejec	(719) 556-4184

The exact date and location for the sessions will be determined approximately 30 days in advance of the training. The cost of training is presently established at \$25 to be paid by each student in advance of the training. For information about a particular session, the best source is the point of contact listed above.

#### 3.4.5 Organizational Changes

The Contractor shall maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

#### 3.5 SUBMITTALS AND DELIVERABLES

Submittals, if needed, shall be made as specified in Section 01330 SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals and deliverables are in compliance with the contract requirements. When Section 15950A HEATING, VENTILATING AND AIR CONDITIONING (HVAC) CONTROL SYSTEMS; 15951A DIRECT DIGITAL CONTROL FOR HVAC; 15990A TESTING, ADJUSTING, AND BALANCING OF HVAC SYSTEMS; or 15995A COMMISSIONING OF HVAC SYSTEMS are included in the contract, the submittals required by those sections shall be coordinated with Section 01330 SUBMITTAL PROCEDURES to ensure adequate time is allowed for each type of submittal required.

#### 3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of work as follows:

##### 3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

- a. A review of each paragraph of applicable specifications, reference codes, and standards. Prior to the preparatory meeting for each definable feature of work, the Contractor shall provide all technical references (i.e. building codes, life safety codes, etc.) referenced in the project specifications for feature(s) of work being addressed at the preparatory meeting. These technical references shall be onsite and available for use by Contractor and Government personnel before the preparatory meeting is held and maintained until the feature(s) of work is/are accepted by the Government.
- b. A review of the contract drawings.

- c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.
- d. Review of provisions that have been made to provide required control inspection and testing.
- e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
- f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
- g. A review of the appropriate activity hazard analysis to assure safety requirements are met.
- h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.
- i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.
- j. Discussion of the initial control phase.
- k. The Government shall be notified at least 48 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

### 3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

- a. A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.
- b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.
- c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.
- d. Resolve all differences.
- e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

- f. The Government shall be notified at least 48 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
- g. The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

### 3.6.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

### 3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

## 3.7 TESTS

### 3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

- a. Verify that testing procedures comply with contract requirements.
- b. Verify that facilities and testing equipment are available and comply with testing standards.
- c. Check test instrument calibration data against certified standards.
- d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
- e. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If

approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

### 3.7.2 Testing Laboratories

#### 3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

#### 3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed the actual cost for the recheck to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

### 3.7.3 Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

### 3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Resident or Area Office (as directed).

Coordination for each specific test, exact delivery location, and dates will be made through the Resident or Area (as directed) Office.

## 3.8 COMPLETION INSPECTION

### 3.8.1 Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the Special Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications, the CQC Manager shall conduct an inspection of the work. A punch list of items which do not conform to the approved drawings and specifications shall be prepared and included in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected.

Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

### 3.8.2 Pre-Final Inspection

The Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

### 3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

## 3.9 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

- a. Contractor/subcontractor and their area of responsibility.
- b. Operating plant/equipment with hours worked, idle, or down for repair.
- c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.
- d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase shall be identified (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.



- e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
- f. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.
- g. Offsite surveillance activities, including actions taken.
- h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- i. Instructions given/received and conflicts in plans and/or specifications.
- j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Contracting Officer's Representative on the first day following the date(s) covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

### 3.10 SAMPLE FORMS

Sample forms enclosed at the end of this section.

### 3.11 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

# DAILY QUALITY CONTROL REPORT

Weather: \_\_\_\_\_ Precipitation: \_\_\_\_\_ in. \_\_\_\_\_ Temp: \_\_\_\_\_ Min. \_\_\_\_\_ Max. \_\_\_\_\_

[illegible][illegible][illegible]

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by NAS activity number).

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4. Control Activities Performed:

Preparatory Inspections: (Identify feature of work and attach minutes).

Initial Inspections: (Identify feature of work and attach minutes).

Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

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5. Tests Performed and Test Results: (Identify test requirement by paragraph number in specifications and/or sheet number in plans).

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6. Material Received: (Note inspection results and storage provided).

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7. Submittals Reviewed:

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

8. Offsite Surveillance Activities, Including Action Taken:

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9. Job Safety: (List items checked, results, instructions and corrective actions taken).

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10. Remarks: (Instructions received or given. Conflict(s) in Plans and/or specifications. Delays encountered.).

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Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

\_\_\_\_\_  
CQC System Manager

\_\_\_\_\_  
Date

-- End of Section --

CONTROL TOWER  
PN: XQPZ400500  
USAF ACADEMY, COLORADO

ATTACHMENTS

**ATTACHMENT NO. 1:** PRELIMINARY SOILS AND FOUNDATION  
INFORMATION

**ATTACHMENT NO. 2:** 2A-PHOTOS/2B-AIRFIELD CLEARANCE/2C-CABLE  
ROUTING

**ATTACHMENT NO. 3:** SPECIFICATION USAGE

ATTACHMENT NO. 3A INDEX OF UFGS

ATTACHMENT NO. 3B UNEDITED OMAHA DISTRICT GUIDE SPECIFICATION

01356 STORM WATER POLLUTION PREVENTION MEASURES

01565 (FEDERAL FACILITIES COLORADO) NPDES PERMIT  
REQUIREMENTS

01565ATT1 NPDES (COLORADO FEDERAL LANDS)

01565ATT2 ENDANGED SPECIES CONSIDERATIONS

02210 GRADING

02440 TRAFFIC SIGNS

02560 (COLORADO) PAVEMENTS FOR SMALL PROJECTS

ATTACHMENT NO. 3C EDITED OMAHA DISTRICT GUIDE SPECIFICATION

15951 DIRECT DIGITAL CONTROL FOR HVAC

**ATTACHMENT NO. 4:** INTERIOR GUIDELINES & CID FURNITURE  
REQUIREMENTS

**ATTACHMENT NO. 5:** 10TH COMM SQUADRON SYSTEM & CABLE  
SPECIFICATION

**ATTACHMENT NO. 6:** PAVEMENT CALCULATION SHEETS

**ATTACHMENT NO. 7:** METRIC DESIGN GUIDE (MDG)

**ATTACHMENT NO. 8:** ENGINEERING TECHNICAL LETTERS

**ATTACHMENT NO. 9:** USAF AIR TRAFFIC CONTROL TOWER DESIGN GUIDE

**ATTACHMENT NO. 10:** DEPARTMENT OF DEFENSE ANTITERRORISM  
CONSTRUCTION STANDARDS

**ATTACHMENT NO. 11:** RFP DRAWINGS

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# **ATTACHMENT NO. 1**

## **PRELIMINARY SOILS AND FOUNDATION INFORMATION FOR CONTROL TOWER, USAFA, COLORADO**

10 January 2002

MEMORANDUM FOR CENWO-PM-M (Hodges)

SUBJECT: Preliminary Soils and Foundation Information for the Control Tower  
at the United States Air Force Academy, Colorado

1. Enclosed is the Preliminary Soils and Foundation Information report for the  
design of the Control Tower project at US Air Force Academy, Colorado.

2. Questions regarding this report may be directed to Gordon Lewis, CENWO-ED-GA, (402)  
221-4306.

Encl  
as

JOHN W. MONZINGO, P.E.  
Chief, Geotechnical Engineering  
and Sciences Branch

Lewis/ggl/4306

Rouse/CENWO-ED-GG

Skeen/CENWO-ED-GG

Ray/CENWO-ED-GA

Monzingo/CENWO-ED-G



30 January, 2002

MEMORANDUM FOR

CENWO-PM-M (Hodges)

SUBJECT: SOILS INFORMATION REPORT ADDENDUM: SOIL RESISTIVITY, pH, SULFATE ION  
CONTENT

Project: CONTROL TOWER

Project Location: UNITED STATES AIR FORCE ACADEMY, COLORADO

1. This Addendum reports the results of soil resistivity, pH, and sulfate ion content tests performed on samples obtained during the subsurface investigation. These results are intended as preliminary information. Cathodic protection requirements should be based on the results of the final investigation performed by the Contractor.
2. Sample AF01-4 D-3 was reported to have a soil resistivity of 2070 ohm-cm, a pH of 7.1 and a sulfate ion content of 25 mg/L. Sample AF01-6 D-7 had a soil resistivity of 3050 ohm-cm, a pH of 4.2 (suspect) and a sulfate ion content of 13 mg/L. Sample AF01-7 D-3 had a soil resistivity of 2500 ohm-cm, a pH of 7.2 and a sulfate ion content of 10 mg/L. Refer to the soil boring logs for the locations of the samples. The resistivity values are somewhat anomalous for the installation; values are typically higher than these results. However the test method utilizes a saturated paste that yields lower values than does dry analysis. The sulfate ion content results are typical for the installation.

Foundations & Materials Contact/Ext.: Gordon G. Lewis 402 221-4306

**PRELIMINARY SOILS AND FOUNDATION INFORMATION  
CONTROL TOWER  
UNITED STATES AIR FORCE ACADEMY, COLORADO**

**1. Scope**

The results of the field investigation for the Control Tower at the Air Force Academy, Colorado are presented in this report. The scope of the study was to (1) evaluate the engineering properties of the subsoils; (2) provide allowable soil bearing pressures and (3) recommend types and depths of foundation elements and other measures pertinent to foundation design and construction. Laboratory testing for soil classification is currently underway. The recommendations included in this report are based on the results of field activities and visual material descriptions. No significant changes to these recommendations are anticipated. Supplemental information will be provided when results are received from the lab. It is the author's understanding that this report will be used as preliminary information, and that final design will be based on a subsurface investigation performed by the Contractor.

**2. Proposed Construction**

This project involves construction of an approximately 24.4 meter (80 foot) tall control tower with an adjacent single story building and paved parking and drives. The tower, as described, will consist of two 17 meter (56-foot) legs of either reinforced concrete or steel, mounting a centralized cab at the top. No subsurface space is planned.

**3. Subsurface Investigations**

**3.1. General**

An Omaha District drill crew conducted the field investigation for the Control Tower at the Air Force Academy on 18 November 2001. The exploratory program consisted of five (5) test borings numbered sequentially from AF01-3 through AF01-7. The borings were advanced with a Gus Pech 100C truck-mounted soil-sampling rig using 10.8-cm (4.25-inch) inside diameter (I.D.) hollow-stem augers. Borings for the single story building were drilled to a depth of 6.1 meters (20 feet); those for the control tower were drilled to a depth of 13.7 meters (45 feet).

Boring locations were chosen by the Corps of Engineers geotechnical engineer and staked in the field by the field geologist. Borings were located by measuring distances from existing structures. Base personnel provided utility clearances with assistance from the Corps of Engineers Field Geologist. Due to an existing parking lot on the site, the borings had to be moved from their original locations. The amount of offset necessary ranged from one to 15 meters (three to fifty feet).

TABLE 1: Summary of Borings

Boring Number	Date Drilled	Total Depth m (ft)	Water During Drilling (m)	Water After Drilling (m)
AF01-3	18 Nov 2001	6.1 (20)	NE	NE
AF01-4	18 Nov 2001	6.1 (20)	NE	NE
AF01-5	18 Nov 2001	6.1 (20)	NE	NE

AF01-6	18 Nov 2001	13.7 (45)	NE	NE
AF01-7	18 Nov 2001	13.7 (45)	NE	NE *

NE - Not Encountered \* Bore hole was damp at the bottom

### **3.2. Standard Penetration Tests**

Standard penetration tests were taken in all borings at depth intervals of 76 cm (2.5 feet) for the first 3.05 meters (10 feet) and every 1.52 meters (5 feet) for the remaining depth of the boring. The standard penetration samples were obtained in accordance with ASTM D 1586-99 "Penetration Test and Split-Barrel Sampling of Soils", using a 63.5-kg (140-pound) automatic trip hammer.

### **3.3. Disturbed Sampling**

Representative disturbed samples of the subsoils were taken with a 51-mm (2.0-inch) O.D. standard steel split spoon sampler using a 63.5-kg (140-pound) automatic SPT hammer, in accordance with ASTM D 1586-99. Samples were collected every 76 cm (2.5 feet) for the first 3.05 m (10 feet), then every 1.52 meters (5 feet) for the remaining depth of the hole. Samples were placed in a pint jar and the lid sealed airtight with at least three wraps of electrical tape. Each jar was labeled, denoting the hole number, sample number, depth of sample, date collected, and the project name. The jars were placed in wooden boxes that were subsequently labeled with the appropriate project information. Samples were delivered to the Omaha District Quality Assurance Facility.

### **3.4. Undisturbed Sampling**

Due to the granular and hard dry soils present at the site undisturbed sampling was not possible.

## **4. Laboratory Testing**

Tests are under way at the Terracon Incorporated laboratory in Omaha, NE to determine visual classification, Atterberg Limits, grain size distribution, natural moisture content, sulfate ion content, soil pH and soil resistivity. All tests are being conducted in accordance with EM 1110-2-1906 "Laboratory Soils Testing".

Based upon the results of the testing program, the field logs will be revised and supplemented and shown on the boring logs. These final logs represent an interpretation and compilation of the content of the field logs and the results of the laboratory tests of the field samples. The stratification lines shown on the boring logs represent the approximate boundaries between soil types and may be gradual. Boring logs will be included in the project drawings and available from the Geotechnical Branch, Soils Section A, of the Omaha District.

## **5. Site Conditions**

### **5.1. General Geology**

The U.S. Air Force Academy is located along the western margin of the Colorado Piedmont Section of the Great Plains Physiographic Province. The section is characterized as an old erosional surface with broadly rolling to scarped, steeply sloped topography. The Rocky Mountains form the western margin of this region. Uplift of the mountains resulted in faulting and folding of adjacent sedimentary formations. Denudation of the igneous core of the mountains (primarily granite) resulted in the subsequent aggradation of numerous pediments along their front. These pediments consist of silty sand and gravel with occasional boulders in the lowermost pediments, increasing in frequency toward the upper ones. Underlying these sediments is the Dawson Formation, which comprises bedrock in the area. The Upper Dawson Formation consists of arkosic conglomerate, sandstone, siltstone and claystone. These beds are light gray, pink or light reddish brown. Individual beds vary in both thickness and consistency throughout the formation.

## **5.2. Site-Specific Geology**

Based on descriptions provided on the field logs, the soils are predominantly silty sand (SM), sand (SW), sandy clay, or silty clay (CL). The clay was encountered at a depth of 5.64 meters (18.5 feet) to bottom of hole at 6.6.1 meters (20 feet) in boring AF01-3, 5.58 to 8.66 meters (18.3 to 28.4 feet) in boring AF01-6, and from 5.18 to 9.14 meters (17 to 30 feet) in boring AF01-7.

## **5.3. Ground Water**

Ground water was not encountered during the investigation. A note was made on the field log for boring AF01-7 that the sample from the bottom of the hole appeared muddy. This may indicate that the capillary fringe was penetrated at this location. Ground water is typically encountered at approximately 15.2 meters (50 feet) below the surface, near the bedrock contact. Bedrock was not reported, however spoon penetration resistance toward the bottom of the deep holes was at or near refusal.

## **5.4. Seismic Evaluation**

The Air Force Academy has a spectral response acceleration for short periods (0.2 second) of 0.19g, and a 1.0 second spectral response of 0.058g. These values were derived using guidance from the U.S. Army Corps of Engineers Technical Instructions "Seismic Design for Buildings" TI 809-04, dated 31 December 1998, and the Federal Emergency Management Agency (FEMA) publication "NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures, 1997 Edition". Both accelerations were interpolated from 1:5,000,000 scale maps prepared by the U.S. Geologic Survey (USGS), Building Seismic Safety Council (BSSC), and FEMA for 0.2 Sec. Spectral Response Acceleration (5% of Critical Damping), Site Class B, and 1.0 Sec. Spectral Response Acceleration (5% Critical Damping), Site Class B, respectively. The spectral response accelerations taken from these maps must be adjusted for site class effects using coefficients provided in the aforementioned guidance. For design purposes, the reference site condition is taken as National Earthquake Hazards Reduction Program (NEHRP) site class D.

## **6. Subsurface Recommendations**

### **6.1. General**

Soils at the project site consist primarily of sand and silty sand to a depth of approximately 5.49 meters (18 feet). A layer of varying thickness of dry sandy or silty clay was present in three of the borings, followed by a return to sand. Prior to adding fill to the site, topsoil should be stripped and the subgrade soils scarified and recompact. A slope of at least 1 percent and preferably 5 percent should be maintained within 3.05 meters (10 feet) of structures to ensure adequate drainage.

## **6.2. Foundation Recommendations**

### **6.2.1. Control Tower: Drilled Cast-In-Place Piers**

The foundation design outlined below is typical of that used for the proposed structure types. The control tower is suited for drilled cast-in-place piers bearing on the dense sands underlying the site due to the relatively high loads and wind-induced overturning moment. Based on the results of Standard Penetration Tests and common pier design practices, piers may be designed for an allowable end-bearing capacity of 766 kPa (16 tons per square foot). Allowable side friction on the pier shaft for the soil strata encountered would be designed as follows:

Depth, m (ft)	Allowable Side Load, kPa (tsf)
0-1.52 (0-5)	0 (0)
1.52-6.1 (5-20)	9.58 (0.10)
6.1-9.14 (20-30)	14.36 (0.15)
9.14+ (30+)	47.88 (0.50)

Piers should have a minimum diameter of 61 cm (24 inches), have straight shafts, and be continuously reinforced to prevent tensional failure. Reinforcement members should have spacers or other centering devices to ensure that at least 50 mm (2 in) of concrete covers them. Failure to provide this minimum cover may allow corrosion of the reinforcement and weakening of the pier. Piers should be completed as soon after drilling as possible; reinforcement and concrete should be placed the same day. The predominant soil type is sand. Casing of the piers will likely be necessary to prevent the holes from caving. It is not recommended that slurry be used to keep the holes open due to the presence of dry clay at depth and the reduction in side friction that would result from wetting. The minimum pier spacing for clusters should be no less than three pier diameters.

Vitally important is the need to leave no loose soil at the base of the pier hole. As little as fifty millimeters (two inches) of loose soil can more than double the movement necessary to development end-bearing capacity. Concrete must be placed via tremie to prevent segregation of aggregate during free fall and to lessen the possibility of leaving voids. The discharge point of the tremie should be maintained below the level of the concrete as it is being placed.

### **6.2.2. Support Building: Shallow Spread and Continuous Footings**

The recommended foundation type for the support building adjacent to the tower is shallow spread and continuous footings. Footings in the conditions encountered at the site would commonly be designed for an allowable excess bearing capacity of 120 kPa (2500 psf). This value represents the maximum

allowable bearing pressure at the base of the footings in excess of that due to existing surrounding overburden.

All exterior footings for heated structures should be founded a minimum of 76 cm (2.5 feet) below final exterior grade to provide adequate frost protection.

All footings for unheated structures should be founded a minimum of 91 cm (3.0 feet) below final exterior grade to provide adequate frost protection.

### **6.3. Slabs on Grade**

A vapor barrier overlying a 150-mm (6-inch) capillary water barrier will be required beneath all floor slabs on grade based on standard practice. A modulus of subgrade reaction "K" of 6.95 kgf/cm<sup>3</sup> (250 pci) is recommended for this case (without frost penetration).

### **6.4. Pavement Design**

Soils underlying pavement are predominantly silty sand (SM) and sand (SW). In some areas a thin layer of clay was encountered at the surface. This material should be stripped and the underlying sandy soil used as subgrade. If the clay layer exceeds one meter (three feet) in depth in an area the depth of stripping may be limited to this one meter (3 feet). The sandy soils have a frost design classification of F2.

If rigid pavement design does not consider frost penetration, a modulus of subgrade reaction "K" of 6.96 kgf/cm<sup>3</sup> (250 pci) is recommended for design purposes. Flexible pavement designs should use a California Bearing Ratio (CBR) value of 20 for subgrades compacted to 95 percent of maximum density per ASTM D 1557-78 when frost is not allowed to penetrate the subgrade. If frost penetration is considered in the design of rigid or flexible pavements, the design should be in accordance with TM 5-818-2 "Pavement Design for Seasonal Frost Conditions".

### **6.5. Settlement**

Based on pier capacity analysis, total settlement should not exceed 25 mm (1.0 inch) under the recommended loading conditions. Differential settlement should not exceed 13 mm (0.50 inch) under such conditions. Similar maximum and differential settlements are predicted for the conventional footings of the support building.

### **6.6. Cementing Properties**

Sulfate ion content tests are being performed on representative samples from the site. Test results have not been received, however based on previous experience at the installation, sulfate ion content is anticipated to be below 0.2 percent, and based on criteria in ACI 201.2 sulfate-resistant cement will not be required for concrete in contact with soil or ground water. The results of laboratory testing will be provided in an addendum to this report when they are available

Due to the potential for alkali-aggregate reactivity within the boundaries of the Omaha District, cement meeting the optional chemical requirements for low

alkali cement on Table 2, ASTM C 150 will also be specified for all concrete. The Resource Conservation Recovery Act (RCRA) mandates, where possible, all concrete specifications will also include the option to use pozzolan as a partial replacement for portland cement.

#### **6.7. Corrosion Potential**

Soil resistivity tests are being performed on representative samples site. Test results have not been received, however based on past experience with similar soil types at the installation, a "moderate" corrosion potential is anticipated. This is in accordance with corrosion classifications in the Department of the Army TM 5-811-4 (17 March 1965), "Electrical Design, Corrosion Control". Soil pH is typically near neutral or slightly alkaline. The results of laboratory testing will be included in an addendum to this report when they are available.

#### **6.8. Lateral Earth Pressure**

Soil resistance for lateral loading of piers was determined to be as shown in the table below. Values are calculated from Rankine earth pressure coefficients increased by a factor of 1.5 to account for soil arching in the vicinity of the pier (after Brom's method):

Depth interval Meters (feet)	Active Pressure kPa (psf)	Passive Pressure kPa (psf)
0-1.5 (0-5)	ignore	ignore
1.5-6.1 (5-20)	1.4 (30)	24 (500)
6.1-9.1 (20-30)	2.8 (60)	17 (360)
9.1+ (30+)	1.0 (20)	40 (830)

#### **7. Construction Considerations**

Although not reported in the borings advanced during this investigation, cobbles and boulders are present in much of the overburden at the Academy and may be encountered during excavation and pier drilling.

The dry climate leads to rapid moisture loss in exposed soils. Care must be taken to prevent excessive drying of subgrades and placed fill prior to completion of construction activities.

U.S. ARMY ENGINEER DISTRICT, OMAHA  
CORPS OF ENGINEERS

- 8.GEOTECHNICAL ANALYSIS CRITERIA
- .1.UNITED STATES AIR FORCE ACADEMY
- .2.CONTROL TOWER

(From Chapter 4, Omaha District Design Guide)

(INDEX)

- 1. GENERAL
- 2. EXPLORATIONS
- 3. SAMPLING
- 4. TESTING
- 5. GEOTECHNICAL REPORT
- 6. DRAWINGS
- 7. COMMON DEFICIENCIES
- 8. REVIEW PROCEDURE
- 9. EXAMPLE INVESTIGATION SCOPE



## OMAHA DISTRICT DESIGN GUIDE

### CHAPTER 4

#### GEOTECHNICAL ANALYSIS

1. **GENERAL.** This scope of work involves subsurface explorations (soil borings, test pits, etc.) for structural foundations, pavement and other geotechnical design elements. This scope presents general instructions for conducting investigations for Government projects and fewer or additional requirements may be required depending on the design needs of the Contractor. An example scope is presented at the end of this chapter. Soil sampling, laboratory testing, analyses and presentation of the subsurface information on 100% (final) drawings is also discussed. Prior to commencing a subsurface investigation, the designer shall submit a proposed soil boring and/or test pit location plan and laboratory testing program for review to this office (Omaha District Corps of Engineers, 106 S. 15th Street, Omaha, NE 68102-1618, Attn: Geotechnical Branch, CEMRO-ED-GA). Reference paragraph REVIEW PROCEDURES for additional information.

The designer shall be responsible for obtaining all utility clearances and a digging permit prior to subsurface work. In addition, the designer shall arrange for security clearances and escorts, if required. If contaminated material is suspected in the investigative area, no subsurface investigation shall be commenced under this scope of work and the Omaha District (reference address above) shall be contacted immediately.

2. **EXPLORATIONS.** In general, explorations shall consist of machine-powered soil borings or test pits dug with a backhoe or similar equipment. Soil borings shall be made with a drill rig capable of recovering undisturbed samples at least  $\sim 3$  inches  $\sim 76$  mm in diameter for testing purposes. The depth and number of borings or test pits shall depend on the size and function of the building(s), the anticipated structural loads or design requirements of the project and the complexity of site geology. Soil borings for structures founded at shallow depth shall be advanced to a minimum of  $\sim 20$  feet  $\sim 6$  m. For structures founded at greater depth the minimum depth of borings shall depend on the type and loading of foundation members. The proposed depths shall be included in the investigation scope submitted under paragraph 1 GENERAL. Soil borings for utilities shall be advanced to a minimum depth of  $\sim 10$  feet  $\sim 3$  m below proposed final grade. Supplemental investigations (e.g. geophysical surveys, trenching, cone penetrometer) may be utilized. The Contractor assumes responsibility for the suitability of the method to provide the information needed for design.

3. **SAMPLING.** If contaminated material is encountered during any sampling procedure, the investigation shall cease and the Geotechnical Branch (see address in paragraph 1) shall be contacted before further sampling occurs.

3.1. **DISTURBED SAMPLES.** Disturbed samples typically consist of jar or bulk (bag) samples. Additional means of collecting samples may be employed as warranted.

3.1.1. **Jar Samples.** Disturbed (jar) samples shall be obtained from split-spoon samplers during standard penetration tests. Standard penetration tests

shall be made in all borings in accordance with ASTM D 1586. Standard penetration tests shall be taken every  $\sim 2.5$  feet  $\sim 0.76$  m for the first  $\sim 10$  feet  $\sim 3$  m, then every  $\sim 5$  feet  $\sim 1.5$  m for the remaining depth of the borings, or as required to fully characterize the site. No standard penetration test shall bottom within  $\sim 0.5$  foot  $\sim 0.15$  m of a potential undisturbed sample zone. If more than one material type is encountered from a split-spoon sample interval, one jar sample shall be obtained of each material type. Jar samples shall be sealed airtight for moisture retention and shall be labeled with the following information: Project name and location; boring or test pit number; sample number; depth; material classification; date; and sampler's initials. When jar samples are obtained for Government use in quality assurance testing or for other purposes, jars shall be  $\sim 1$ -pint  $\sim 0.5$  liter in volume. If no Government QA jars are obtained, sample size shall be sufficient to allow the required tests to be performed; one pint is recommended.

**3.2. UNDISTURBED SAMPLES.** Representative undisturbed three or five-inch diameter Shelby tube samples shall be taken of representative cohesive soil layers if needed for the Contractor's design. In most instances 3-inch tubes will be sufficient, however depending on site soils, 5-inch tubes may be required to obtain good-quality samples. Standard penetration tests shall not be taken within  $\sim 0.5$  foot  $\sim 0.15$  m of an undisturbed sample interval. If the material encountered is not conducive to undisturbed sampling, standard penetration tests shall be taken instead. Shelby tube sampling shall meet requirements of ASTM D 1587.

**3.3. REFUSAL.** If refusal is encountered during drilling or sampling, an attempt shall be made to identify the material or object causing the refusal (bedrock, boulder, etc).

**3.4. FIELD LOGS.** A complete and accurate field log for each boring shall be prepared on Standard Corps of Engineer log forms (ENG Form 1836). Each log shall include the following information as a minimum:

- Name of project
- Boring or test pit number
- Type of exploration performed (e.g. boring with  $\sim 4.25$ "  $\sim 108$  mm inside-diameter hollow-stem augers)
- Diameter of boring or dimensions of test pit
- Description of drill rig or other machinery used
- Size and type of bit used
- Location (depth) of each sample
- Standard penetration test numbers
- Water level information (include time-lapse between completion of drilling and measurement)
- Description of all materials encountered
- Description and sketch showing any offset of the boring from the original location

Soil materials shall be classified using the Unified Soil Classification System. Soil descriptions shall follow ASTM D 2488. Rock descriptions shall follow the nomenclature prescribed in ASTM C 294, or as specified in the project Scope of Services if different. Material descriptions shall include visual classification, consistency, plasticity, moisture content and color, as a minimum.

**3.5. GROUND WATER DATA.** Ground water information shall be recorded during all subsurface explorations. The depth at which water is first encountered and the water level at completion of each boring or test pit shall be recorded on the field logs. If there are indications of ground water within the boring, it shall be left open for at least 24 hours following completion at which time a final water level measurement shall be taken just prior to backfilling. Borings shall be protected from surface water run-in during the time they are open, and covered to prevent endangering persons. Water levels shall be noted during excavation and immediately following completion of test pits, 24-hour water level readings in the pits are not required unless requested by the designers.

**3.6 BACKFILLING.** Backfill for borings shall consist of drill cuttings unless state regulation or Base preference requires grout or other materials. The designer shall coordinate with the Base Point of Contact (POC) to ensure compliance with all requirements. Backfilling shall be accomplished in such a manner that settlement of backfill sufficient to pose a safety hazard does not occur. The designer shall be responsible for immediately correcting any conditions resulting from their operations which pose a safety hazard in the opinion of the Government Representative or Base POC. Excess drill cuttings shall be disposed of as approved by the Government Representative or Base POC.

**3.7. TRANSPORTATION.** Samples shall be delivered in accordance with ASTM D 5079 to a laboratory approved by the Corps of Engineers or a nationally recognized accrediting organization.

**3.8. SITE RESTORATION.** Upon completion of work, the designer shall return the site to a condition satisfactory to the Government Representative or Base POC before departing the site.

**3.9. SAFETY.** The designer shall comply with all applicable safety requirements and the Corps of Engineers Safety Manual (EM 385-1-1) dated October 1992.

**4. TESTING.** Laboratory testing of disturbed and undisturbed samples shall be required to determine engineering characteristics for structural foundation and pavement design. The designer shall determine what testing he requires to fully support the geotechnical aspects of the project.

**4.1. DISTURBED SAMPLES.** Testing for disturbed samples shall consist of moisture content; classification; resistivity; pH and sulfate ion content, and other testing needed by the designer to fully characterize the site. Classification tests shall include visual, mechanical analyses (including hydrometer as applicable) and Atterberg limit tests. Testing and classification of soils shall be in accordance with the Unified Soil Classification System described in ASTM D 2487. Testing for mechanical analysis and Atterberg Limits shall be done in accordance with ASTM D 422 and ASTM D 4318, respectively. Samples may be grouped visually by appearance with mechanical analysis and Atterberg limits performed on each group. In addition, a representative number of samples shall be tested for soil resistivity, pH and sulfate ion content. Soil resistivity shall be determined in accordance with ASTM G 57, laboratory soil-box method or Wenner four-electrode array field method. Soil pH shall be determined in accordance with ASTM G 51. Sulfate ion content shall be determined in accordance with CRD C 403.

**4.2. UNDISTURBED SAMPLES.** Testing for undisturbed samples shall include moisture content; classification; unconfined compressive strength;

unconsolidated undrained compressive strength; consolidation; and swell characteristics, as applicable for the material type and information required for design. Unconfined compressive strength; unconsolidated undrained compressive strength; consolidation and swell tests shall be made in accordance with ASTM Standards D 2166, D 2850, D 2435 and D 4546, respectively. Testing shall be performed in sufficient detail to adequately determine the supporting capacity and foundation characteristics of soil beneath structures, pavement and railroads. Classification tests shall consist of visual, mechanical analyses (including hydrometer as applicable) and Atterberg limit tests in accordance with ASTM publications referenced in the preceding paragraph. The designer shall be responsible for determining what information is required to support his design.

**5. GEOTECHNICAL REPORT.** The geotechnical report shall be based on field observations and laboratory test results of field samples. The report shall document the methods used in arriving at all geotechnical design parameters. A brief discussion of the studies or analyses prepared by the geotechnical engineer to aid in establishing design parameters shall be included in the report. For larger structures, alternative foundation systems shall be presented if more than one system will economically perform the task. Allowable soil bearing values shall be determined for all foundation elements. Soil bearing values shall safely carry the total load with an appropriate factor of safety applied for subsurface variations, construction considerations and other influencing factors. Laboratory test results shall be available or included in the report as an appendix. Each report shall be prepared with consideration given to the following format:

1. Project Scope
  2. Proposed Construction
  3. Field Investigation
  4. Laboratory Testing
  5. Site Conditions (geology, ground water, seismic considerations, etc.)
  6. Foundation Recommendations (excavation considerations, allowable bearing capacities and other soil parameters for structural foundation, pavement and railroad design)
  7. Construction Considerations
- Appendices

**6. DRAWINGS.** The designer shall provide soil boring or test pit logs that depict both field observations and results of laboratory testing on the 100% (final) drawings. Soil boring or test pit locations shall also be shown on the 100% drawings, preferably on the site plan where exploration locations may be referenced to structural features of the project. Elevations of the top of borings and the water table, if encountered, shall be shown on the drawings if they are known. If not known they shall be referenced to the existing ground surface. If feasible, a schematic sketch of new structures with foundation depths noted shall be shown on the boring logs; thus indicating required cut and fill and soil strata on which foundation elements will bear. The level of drawing presentation for soil borings logs is as shown on the sheet titled "SOIL BORING LOGS AND LOCATION MAP" in the Example Drawing Package.

**7. COMMON DEFICIENCIES.**

**7.2.** Failure to incorporate information obtained during the geotechnical investigation into the plans and specifications.

**7.3.** An inadequate number of, or depth of borings to characterize the site.

7.4. Failure to conduct a sufficient number of field and laboratory tests by prescribed ASTM standards to accurately characterize subsoils for design purposes.

7.5. Failure to accurately note top of bedrock, refusal, ground water elevations, and depth of unsuitable soil layers on field logs and on 100% (final) drawings.

7.6. Incomplete geotechnical calculations as back-up for specific geotechnical recommendations.

7.7. Use of incorrect format for soil boring or test pit logs (i.e. soil descriptions, standard penetration blow counts, laboratory data, ground water information). Reference the SOIL BORING LOGS AND LOCATION MAP included in the Example Drawing Package.

7.8. Incorrect field sampling methods and material handling techniques.

## **8. REVIEW PROCEDURES.**

8.1. The designer shall submit a proposal that outlines the extent of the geotechnical investigation. The proposal shall include approved site and floor plans on which boring locations are identified and depths specified. Sampling intervals shall be included, along with a summary of proposed field and laboratory testing. The proposal shall address prominent geotechnical features of the project and shall be submitted for approval to the Omaha District (reference paragraph 1 for address) at least 7 days prior to commencing field work. The designer may contact David Ray or the project geotechnical engineer from the Omaha District Geotechnical Branch for clarification of this document. Mr. Ray may be reached by telephone at (402) 221-4493.

8.2. Deliverables submitted by the designer typically include the complete geotechnical report with appropriate calculations, project field logs, and the completed soil boring or test pit logs on 100% (final) drawings. The 100% drawings shall include soil boring locations which may be shown on the site plan. This submittal shall be reviewed for completeness and approved by the Omaha District (reference paragraph 1 for address) prior to completion of 100% (final) design.

## **9.0 EXAMPLE SCOPE.**

The example scope is outlined in the Preliminary Soils and Foundation Information report and was based on past experience at the base and on the need to generate site information for the Request For Proposal (RFP) stage of the project. The investigation scope required to provide the information the design-build Contractor needs for final design of the entire project is his responsibility.

The proposed site for this project is in an area that may present specific geotechnical difficulties based on previous experience, the main one being cobbles and boulders at the surface and in the subsurface. Refusal on these clasts was not encountered during the preliminary investigation at the tower site, but they often have a random distribution.

The analysis and design discussion presented in the preliminary soils information document is based on the results of a limited field investigation and should not be interpreted as design directive. The Contractor must satisfy himself with regard to gaining sufficient knowledge of the subsurface conditions at the project site

3.

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## **ATTACHMENT NO. 2**

**2A:** Photos of Existing Structures and Pavements to be Removed

### **Photos**

Control Tower and Runway Supervisory Unit

Control Tower

GATR Building

**2B:** 7:1 Ratio Airfield Clearance Line location sheet.

**2 C:** Cable Routing, Manhole 1 & Manhole 2 locations



CONTROL TOWER #9229 AND RUNWAY SUPERVISORY UNIT #9232 TO BE REMOVED



CONTROL TOWER #9212 TO BE REMOVED



GATR BUILDING #9205 TO BE REMOVED



GATR BUILDING #9205 TO BE REMOVED

## **Attachment 2B:**

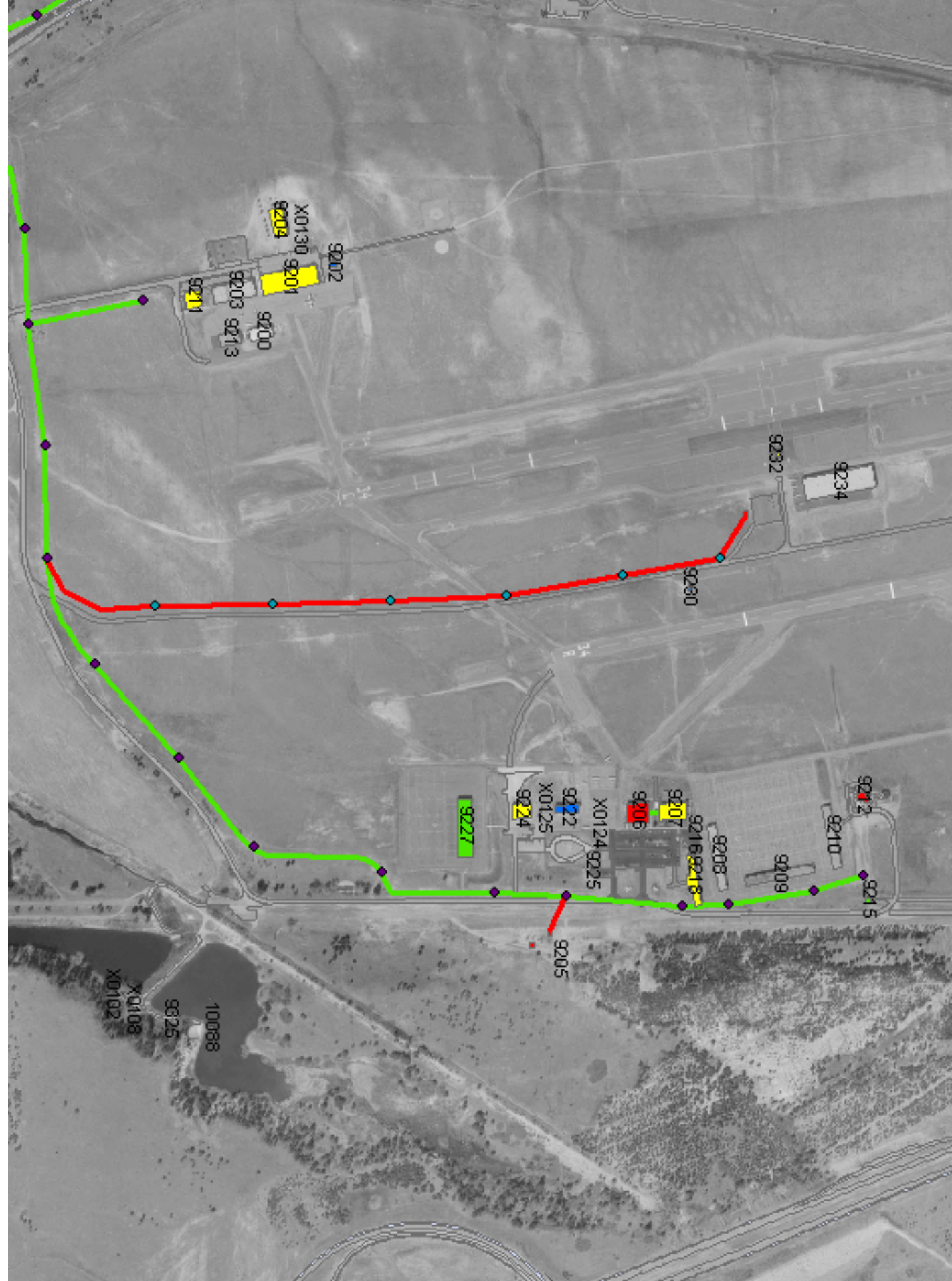
### 7:1 Ratio Airfield Clearance Line Location Sheet

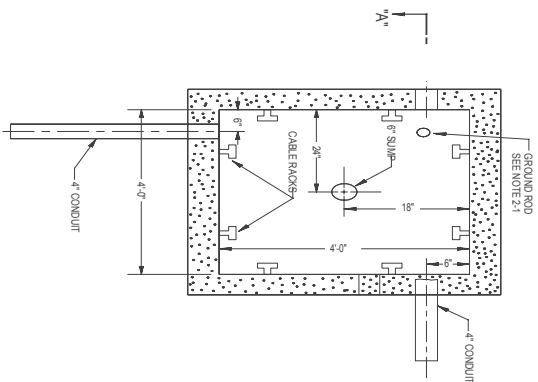


## **Attachment 2 C:**

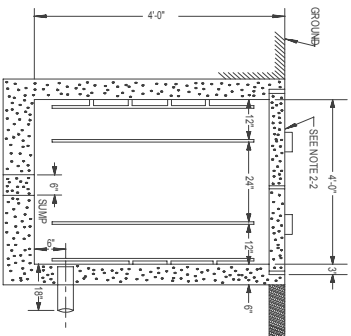
Cable Routing, Manhole 1 & Manhole 2  
locations







TOP VIEW  
SCALE NONE

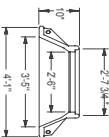


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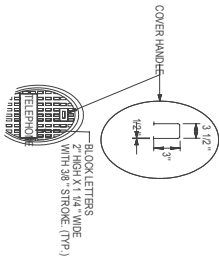
HANDHOLE



NO SCALE  
BOTTOM VIEW



DETAIL "C-C"  
MANHOLE FRAME AND COVER



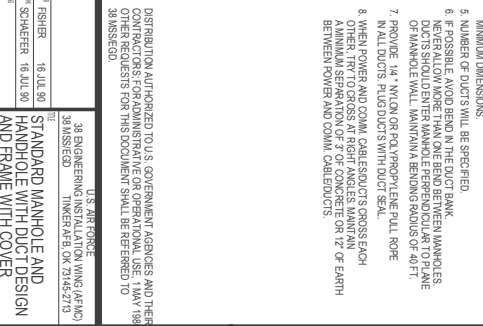
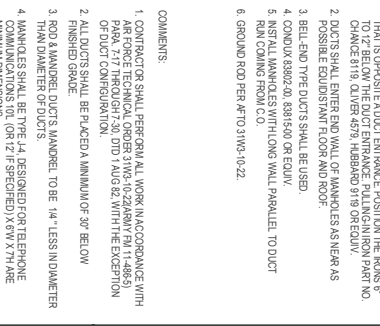
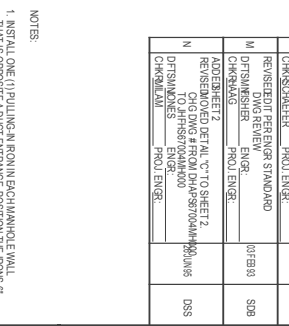
TOP PLAN VIEW

- ENGINEERING NOTES:
- 2.1. DRIVE A 1/4" DIA BY 10 FT COPPER CLAD STEEL GROUND ROD TO A DEPTH SO THAT 6 IN WILL BE ABOVE THE FINISHED MANHOLE FLOOR. CONNECT THE GROUND ROD TO TWO HORIZONTAL DIAGONAL REINFORCING BARS. THE CONNECTIONS WILL BE 6 #2 BARS. THE BARS SHALL BE CLAMPED & BRACED TO THE CONCRETE FLOORING. THE BARS WILL BE TIED FROM THE CONCRETE FLOORING. THE DESIRED GOAL IS A 10 OHM OR LESS RESISTANCE TO GROUND.
  - 2.2. FILL ACCESS COVER, HANDHOLE LOAD BEARING CONCRETE FLOORING SHALL BE DETERMINED BY BASE CIVIL ENGINEERING.
  - 2.3. BELL END TYPE DUCTS SHALL BE USED.

DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES AND THEIR CONTRACTORS FOR ADMINISTRATIVE OR OPERATIONAL USE. 1 MAY 1988. OTHER REQUESTS FOR THIS DOCUMENT SHALL BE REFERRED TO 36 MSSFCO.

U.S. AIR FORCE		U.S. AIR FORCE		U.S. AIR FORCE	
DATE	REVISION	DATE	REVISION	DATE	REVISION
APR 1995	1	APR 1995	1	APR 1995	1
APR 1995	2	APR 1995	2	APR 1995	2
APR 1995	3	APR 1995	3	APR 1995	3
APR 1995	4	APR 1995	4	APR 1995	4
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FISHER 16 JUL 90	STANDARD MANHOLE AND
SCHNEIDER 16 JUL 90	HANDHOLE WITH DUCT DESIGN
	AND FRAME WITH COVER

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# **ATTACHMENT NO. 3**

## **SPECIFICATION USAGE**

**PART A: List of Unified Facilities Guide Specifications (UFGS)**

**PART B: Omaha District Guide Specs.**

**PART C: Government Edited Technical Guide Specifications**

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## **PART A**

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 07720A 04/00 ROOF VENTILATORS, GRAVITY-TYPE  
 07810N 09/99 SPRAY-APPLIED FIREPROOFING  
 07810a 07/01 SPRAY-APPLIED FIREPROOFING  
 07840N 09/99 FIRESTOPPING  
 07840a 08/00 FIRESTOPPING  
 07900a 06/97 JOINT SEALING  
 07920N 09/99 JOINT SEALANTS

#### DIVISION 08 - DOORS & WINDOWS

08110 05/01 STEEL DOORS AND FRAMES  
 08120 09/99 ALUMINUM DOORS AND FRAMES  
 08161 08/01 ALUMINUM SLIDING GLASS DOORS  
 08162 08/01 SLIDING FIRE DOORS  
 08165a 11/01 SLIDING METAL DOORS  
 08181 08/01 METAL STORM DOORS  
 08210 09/99 WOOD DOORS  
 08302N 08/01 CORROSION CONTROL HANGAR DOORS  
 08315N 09/01 BLAST RESISTANT DOORS (OVAL ARCH MAGAZINES)  
 08330a 06/97 OVERHEAD ROLLING DOORS  
 08331N 08/01 ROLLING SERVICE [AND FIRE] DOORS  
 08331a 09/98 METAL ROLLING COUNTER DOORS  
 08342 03/01 STEEL SLIDING HANGAR DOORS  
 08361 08/01 SECTIONAL OVERHEAD DOORS  
 08370 08/01 VERTICAL LIFT DOORS  
 08390 04/01 BLAST RESISTANT DOORS  
 08510 08/01 STEEL WINDOWS  
 08520N 08/01 ALUMINUM WINDOWS  
 08520a 03/00 ALUMINUM AND ENVIRONMENTAL CONTROL ALUMINUM WINDOWS  
 08550 08/01 WOOD WINDOWS  
 08560 08/01 PLASTIC WINDOWS  
 08581 08/01 BLAST RESISTANT TEMPERED GLASS WINDOWS  
 08582 08/01 ALUMINUM STORM WINDOWS  
 08590 08/97 WOOD WINDOWS - REPAIR AND REHABILITATION  
 08600 08/00 SKYLIGHTS  
 08710 08/01 DOOR HARDWARE  
 08745 08/01 ELECTRICAL LOCKING CONTROL FOR BRIGS  
 08800N 09/99 GLAZING  
 08810a 05/97 GLASS AND GLAZING  
 08840a 07/95 PLASTIC GLAZING  
 08850 07/92 FRAGMENT RETENTION FILM FOR GLASS  
 08900 09/99 GLAZED CURTAIN WALL

#### DIVISION 09 - FINISHES

09100N 09/99 METAL SUPPORT ASSEMBLIES  
 09200a 06/97 LATHING AND PLASTERING

09205N 09/99 FURRING AND LATHING  
 09212N 09/00 GYPSUM PLASTER, CEMENT PLASTER, AND STUCCO  
 09215N 09/99 VENEER PLASTER  
 09215a 11/95 VENEER PLASTER  
 09225A 11/95 STUCCO  
 09250 11/01 GYPSUM BOARD  
 09310A 11/01 CERAMIC TILE  
 09310N 09/99 CERAMIC TILE, QUARRY TILE, AND PAVER TILE  
 09331N 09/99 CHEMICAL-RESISTANT QUARRY TILE  
 09410N 09/99 PORTLAND CEMENT TERRAZZO  
 09411A 01/96 BONDED TERRAZZO  
 09421A 11/95 TERRAZZO TILE  
 09445A 01/96 RESINOUS TERRAZZO FLOORING  
 09510A 10/01 ACOUSTICAL CEILINGS  
 09510N 09/99 ACOUSTICAL CEILINGS  
 09611N 03/01 THIN FILM FLOORING SYSTEM FOR AIRCRAFT MAINTENANCE FACILITIES  
 09612N 03/01 EPOXY MORTAR FLOORING SYSTEM FOR AIRCRAFT MAINTENANCE  
 FACILITIES  
 09620A 01/98 RESILIENT ATHLETIC FLOORING  
 09640A 11/01 WOOD STRIP FLOORING  
 09641A 04/01 HARDWOOD PARQUET FLOORING  
 09641N 08/01 WOOD ATHLETIC FLOORING  
 09643N 08/01 PORTABLE (DEMOUNTABLE) WOOD FLOORING  
 09645N 08/01 WOOD PARQUET FLOORING  
 09650A 07/96 RESILIENT FLOORING  
 09651N 08/01 RESILIENT TILE FLOORING  
 09655N 08/01 RESILIENT SHEET FLOORING  
 09656N 08/01 RESILIENT SHEET FLOORING (INSTITUTIONAL)  
 09660A 01/98 CONDUCTIVE VINYL FLOORING  
 09670A 04/01 INDUSTRIAL RESIN-BASED FLOORING  
 09670N 08/01 FLUID-APPLIED FLOORING  
 09680A 05/01 CARPET  
 09680N 08/01 CARPET  
 09685N 08/01 CARPET TILE  
 09720A 04/01 WALLCOVERINGS  
 09721N 08/01 VINYL COATED FABRIC WALL COVERING  
 09840A 11/01 ACOUSTICAL WALL TREATMENT  
 09900 09/01 PAINTS AND COATINGS  
 09910N 03/00 MAINTENANCE, REPAIR, AND COATING OF TALL ANTENNA TOWERS  
 09915 06/93 COLOR SCHEDULE  
 09963N 09/99 HIGH-BUILD GLAZE COATINGS  
 09965A 04/01 PAINTING: HYDRAULIC STRUCTURES  
 09965N 08/01 METALLIC TYPE CONDUCTIVE/SPARK RESISTANT CONCRETE FLOOR FINISH  
 09967N 09/99 COATING OF STEEL WATERFRONT STRUCTURES  
 09970N 09/01 INTERIOR COATING OF WELDED STEEL PETROLEUM FUEL TANKS  
 09971 09/01 EXTERIOR COATING OF STEEL STRUCTURES  
 09971A 10/00 METALLIZING: HYDRAULIC STRUCTURES  
 09972 09/01 INTERIOR COATING OF WELDED STEEL WATER TANKS  
 09973 09/01 INTERIOR COATING OF WELDED STEEL PETROLEUM FUEL TANKS  
 09974N 09/00 PROTECTION OF BURIED STEEL PIPING AND STEEL BULKHEAD TIE RODS  
 09980N 09/99 INTERIOR LINING FOR CONCRETE STORAGE TANKS (FOR PETROLEUM  
 FUELS)  
 09981N 09/98 LINSEED OIL PROTECTION OF CONCRETE SURFACES  
 09995 01/98 PREPARATION OF HISTORIC WOOD AND METAL SURFACES FOR PAINTING

#### DIVISION 10 - SPECIALTIES

10100A 11/00 VISUAL COMMUNICATIONS SPECIALTIES  
 10153N 09/99 TOILET PARTITIONS

10160A 07/98 TOILET PARTITIONS  
 10191N 08/01 CUBICLE TRACK AND HARDWARE  
 10201N 09/99 METAL [WALL] [AND] [DOOR] LOUVERS  
 10260A 12/95 WALL AND CORNER PROTECTION  
 10260N 09/99 WALL AND CORNER GUARDS  
 10270A 01/97 RAISED FLOOR SYSTEM  
 10270N 09/99 ACCESS FLOORING  
 10400N 09/99 IDENTIFICATION DEVICES  
 10430A 06/01 EXTERIOR SIGNAGE  
 10440A 06/01 INTERIOR SIGNAGE  
 10505N 09/99 STEEL CLOTHING LOCKERS  
 10605N 09/99 WIRE MESH PARTITIONS  
 10615A 08/00 DEMOUNTABLE PARTITIONS  
 10650A 08/00 OPERABLE PARTITIONS  
 10652N 08/01 OPERABLE PANEL PARTITIONS  
 10655N 08/01 ACCORDION FOLDING PARTITIONS  
 10675N 09/99 STEEL SHELVING  
 10716N 08/01 STORM SHUTTERS  
 10800A 04/01 TOILET ACCESSORIES  
 10800N 09/99 TOILET AND BATH ACCESSORIES

#### DIVISION 11 - EQUIPMENT

11020A 12/97 SECURITY VAULT DOOR  
 11020N 09/99 SECURITY VAULT DOOR [AND DAY GATE]  
 11022A 12/88 DOORS; FIRE-INSULATED, RECORD-VAULT  
 11025 08/01 FORCED ENTRY RESISTANT COMPONENTS  
 11035 04/00 BULLET-RESISTANT COMPONENTS  
 11145A 04/01 AVIATION FUELING SYSTEMS  
 11161N 09/99 DOCK LEVELERS  
 11162A 08/00 LOADING DOCK LEVELER  
 11171N 08/01 PACKAGED INCINERATORS  
 11181A 02/90 INCINERATORS, GENERAL PURPOSE  
 11182A 08/01 INCINERATORS, MEDICAL WASTE  
 11191 09/99 DETENTION AND SECURITY WINDOWS  
 11192 09/99 DETENTION AND SECURITY GLAZING  
 11193 09/99 DETENTION HOLLOW METAL FRAMES, DOORS, AND DOOR FRAMES  
 11194 08/01 DETENTION HARDWARE  
 11195 09/99 DETENTION FURNITURE AND ACCESSORIES  
 11211A 12/88 PUMPS: WATER, CENTRIFUGAL  
 11212A 03/89 PUMPS: WATER, VERTICAL TURBINE  
 11215A 06/01 FANS/BLOWERS/PUMPS; OFF-GAS  
 11220A 09/97 PRECIPITATION/COAGULATION/FLOCCULATION WATER TREATMENT  
 11225A 06/01 DOWNFLOW LIQUID ACTIVATED CARBON ADSORPTION UNITS  
 11226A 04/98 VAPOR PHASE ACTIVATED CARBON ADSORPTION UNITS  
 11241A 12/88 CHLORINE-FEEDING MACHINES (AUTOMATIC, SEMIAUTOMATIC AND MANUAL)  
 11242A 12/01 CHEMICAL FEED SYSTEMS  
 11243A 04/99 CHEMICAL TREATMENT OF WATER FOR MECHANICAL SYSTEMS  
 11250A 11/01 WATER SOFTENERS, CATION-EXCHANGE (SODIUM CYCLE)  
 11285A 01/94 MITER GATES  
 11286A 01/94 SECTOR GATES  
 11287A 01/94 TAINTER GATES AND ANCHORAGES  
 11288A 07/93 VERTICAL LIFT GATES  
 11289A 04/93 CLOSURE GATES  
 11301A 04/99 AIR STRIPPER  
 11310A 11/90 PUMPS; SEWAGE AND SLUDGE  
 11311N 08/01 PARALLEL PLATE [OR VERTICAL TUBE], GRAVITY OIL-WATER SEPARATOR  
 11312A 04/98 SIPHONS, DOSING  
 11312N 01/01 PACKAGE [GRINDER PUMP][LIFT] STATION

11313A 04/01 PNEUMATIC SEWAGE EJECTORS  
 11320N 08/01 GRIT COLLECTING EQUIPMENT  
 11330A 04/89 SEWAGE BAR SCREEN AND MECHANICAL SHREDDER  
 11331N 08/01 COMMINUTOR  
 11334A 01/89 COMMINUTOR  
 11338N 08/01 CIRCULAR CLARIFIER  
 11350A 07/01 SLUDGE-COLLECTING EQUIPMENT  
 11360A 06/01 RECESSED CHAMBER FILTER PRESS SYSTEM  
 11365A 06/90 TRICKLING FILTER  
 11375A 11/01 AIR SUPPLY AND DIFFUSION EQUIPMENT FOR SEWAGE TREATMENT  
 11375N 08/01 AERATION EQUIPMENT  
 11376 03/93 ULTRAVIOLET DISINFECTION EQUIPMENT  
 11377 06/01 ADVANCED OXIDATION PROCESSES (AOP)  
 11378 10/01 THERMAL (CATALYTIC) OXIDATION SYSTEMS  
 11380 12/89 SLUDGE-DIGESTER GAS, HEATING, AND MIXING SYSTEM  
 11390 08/01 PREFABRICATED BIOCHEMICAL WASTEWATER TREATMENT PLANT  
 11391 08/01 CONTINUOUS LOOP REACTOR WASTEWATER TREATMENT SYSTEM  
 11393 06/01 FILTRATION SYSTEM  
 11400A 01/02 FOOD SERVICE EQUIPMENT  
 11400N 09/99 FOOD SERVICE EQUIPMENT  
 11401N 08/01 ELECTRIC KITCHEN EQUIPMENT  
 11475 08/01 RADIOGRAPHIC DARKROOM EQUIPMENT  
 11500A 05/01 AIR POLLUTION CONTROL  
 11601N 08/01 LABORATORY EQUIPMENT AND FUMEHOODS  
 11613N 08/01 STILLs AND ASSOCIATED EQUIPMENT  
 11700N 08/01 GENERAL REQUIREMENTS FOR MEDICAL AND DENTAL EQUIPMENT  
 11702N 08/01 MEDICAL EQUIPMENT, MISCELLANEOUS  
 11704N 09/99 [CASEWORK] [AND] [MATERIAL HANDLING UNITS] IN MEDICAL FACILITIES  
 11706N 09/99 HYDROTHERAPY EQUIPMENT  
 11707N 08/01 HOSPITAL AND LABORATORY WASHING EQUIPMENT  
 11708N 09/99 INSTALLATION OF GOVERNMENT-FURNISHED MEDICAL EQUIPMENT  
 11710A 07/01 WARMING CABINETS, STERILIZERS, AND ASSOCIATED EQUIPMENT  
 11712N 08/01 STERILIZERS AND ASSOCIATED EQUIPMENT  
 11744N 09/99 DENTAL EQUIPMENT

#### DIVISION 12 - FURNISHINGS

12301N 09/99 MANUFACTURED VANITIES  
 12302N 09/99 WARDROBE STORAGE CABINETS (THREE DRAWER)  
 12303N 09/99 WARDROBES  
 12320A 05/98 CABINETS AND COUNTERTOPS  
 12350A 04/99 CASEWORK FOR MEDICAL AND DENTAL FACILITIES  
 12351N 03/01 MEDICAL AND DENTAL CASEWORK  
 12352N 09/99 RESIDENTIAL CASEWORK  
 12490A 01/98 WINDOW TREATMENT  
 12490N 09/99 BLINDS, VENETIAN (AND AUDIO VISUAL)  
 12491N 08/01 CURTAINS AND DRAPES  
 12600A 01/98 THEATER CHAIRS  
 12601N 09/99 THEATER SEATING  
 12705 06/01 FURNITURE SYSTEMS

#### DIVISION 13 - SPECIAL CONSTRUCTION

13034N 08/01 PREFABRICATED AUDIOMETRIC ROOMS  
 13038 08/01 COLD-STORAGE ROOMS (PREFABRICATED PANEL TYPE)  
 13080 04/99 SEISMIC PROTECTION FOR MISCELLANEOUS EQUIPMENT  
 13090A 01/94 X-RAY SHIELDING  
 13092N 09/99 X-RAY SHIELDING

13093N 12/01 RADIO FREQUENCY SHIELDED ENCLOSURES, DEMOUNTABLE TYPE  
 13094N 12/01 RADIO FREQUENCY SHIELDED ENCLOSURES, WELDED TYPE  
 13095A 07/01 ELECTROMAGNETIC (EM) SHIELDING  
 13095N 09/99 HEMP SHIELDED DOOR  
 13100A 07/01 LIGHTNING PROTECTION SYSTEM  
 13100N 09/99 LIGHTNING PROTECTION SYSTEM  
 13110A 11/98 CATHODIC PROTECTION SYSTEM (SACRIFICIAL ANODE)  
 13110N 09/00 CATHODIC PROTECTION BY GALVANIC ANODES  
 13111A 11/98 CATHODIC PROTECTION SYSTEM (STEEL WATER TANKS)  
 13111N 08/01 CATHODIC PROTECTION BY IMPRESSED CURRENT  
 13112A 11/98 CATHODIC PROTECTION SYSTEM (IMPRESSED CURRENT)  
 13112N 03/00 CATHODIC PROTECTION SYSTEM (STEEL WATER TANKS)  
 13113A 09/01 CATHODIC PROTECTION SYSTEMS (IMPRESSED CURRENT) FOR LOCK MITER  
 GATES  
 13120A 01/02 STANDARD METAL BUILDING SYSTEMS  
 13121A 01/02 METAL BUILDING SYSTEMS (MINOR REQUIREMENTS)  
 13121N 08/01 PREENGINEERED METAL BUILDINGS  
 13202A 05/97 FUEL STORAGE SYSTEMS  
 13203A 08/93 TIGHTNESS TESTING OF UNDERGROUND FUEL SYSTEMS  
 13205N 08/01 STEEL TANKS WITH FIXED ROOFS  
 13206A 11/88 STEEL STANDPIPES AND GROUND STORAGE RESERVOIRS  
 13208N 09/99 WIRE-WOUND CIRCULAR PRESTRESSED-CONCRETE WATER TANK  
 13209N 09/00 WATER STORAGE TANKS  
 13210A 01/89 ELEVATED STEEL WATER TANK  
 13211A 07/89 PRESSURE VESSELS FOR STORAGE OF COMPRESSED GASES  
 13216N 09/99 UNDERGROUND PETROLEUM TANKS  
 13217N 09/99 FIBERGLASS-PLASTIC LINING FOR STEEL TANK BOTTOMS (FOR  
 PETROLEUM)  
 13219N 09/99 CLEANING PETROLEUM STORAGE TANKS  
 13234A 04/01 FLOATING COVER FOR SLUDGE-DIGESTION TANKS  
 13280A 11/01 ASBESTOS ABATEMENT  
 13281A 04/00 LEAD HAZARD CONTROL ACTIVITIES  
 13281N 01/02 ENGINEERING CONTROL OF ASBESTOS CONTAINING MATERIALS  
 13282N 12/01 REMOVAL AND DISPOSAL OF MATERIAL CONTAINING LEAD  
 13283N 12/01 REMOVAL AND DISPOSAL OF LEAD-CONTAINING PAINT  
 13284N 09/99 REMOVAL AND DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)  
 13285N 09/99 REMOVAL AND DISPOSAL OF PCB CONTAMINATED SOILS  
 13286N 01/01 HANDLING OF LIGHTING BALLASTS AND LAMPS CONTAINING PCBs AND  
 MERCURY  
 13287N 09/99 RADON MITIGATION  
 13290A 03/89 COMPOSTING TOILET  
 13401N 09/99 FLOW MEASURING EQUIPMENT [POTABLE WATER] [SEWAGE TREATMENT  
 PLANT]  
 13405A 07/01 PROCESS CONTROL  
 13420A 11/97 SELF-ACTING BLAST VALVES  
 13451A 03/00 POWER MONITORING SYSTEM  
 13600A 08/01 SOLAR WATER HEATING EQUIPMENT  
 13610N 09/99 SOLAR LIQUID FLAT PLATE COLLECTORS  
 13702N 09/99 BASIC INTRUSION DETECTION SYSTEMS (IDS)  
 13703N 09/99 COMMERCIAL INTRUSION DETECTION SYSTEMS (IDS)  
 13720A 05/98 ELECTRONIC SECURITY SYSTEM  
 13721A 03/97 SMALL INTRUSION DETECTION SYSTEM  
 13798 09/99 DURESS SIGNAL SYSTEM [FOR BRIG FACILITIES]  
 13799 09/99 WATCHTOUR SYSTEM [FOR BRIG FACILITIES]  
 13801A 12/01 UTILITY MONITORING AND CONTROL SYSTEM (UMCS)  
 13814A 04/89 BUILDING PREPARATION FOR ENERGY MONITORING AND CONTROL SYSTEMS  
 (EMCS)  
 13820A 04/01 MULTI-BUILDING EXPANSION OF ENERGY MONITORING AND CONTROL  
 SYSTEMS



13850A 08/98 FIRE DETECTION AND ALARM SYSTEM, DIRECT CURRENT LOOP  
 13851A 08/98 FIRE DETECTION AND ALARM SYSTEM, ADDRESSABLE  
 13851N 09/99 EXTERIOR FIRE ALARM SYSTEM, CLOSED CIRCUIT TELEGRAPHIC TYPE  
 13852A 11/97 FIRE ALARM REPORTING SYSTEM, RADIO TYPE  
 13852N 09/99 INTERIOR FIRE DETECTION AND ALARM SYSTEM  
 13853A 11/97 CENTRAL FIRE ALARM SYSTEM, DIGITAL ALARM COMMUNICATOR TYPE  
 13853N 09/99 FIRE ALARM SYSTEM, RADIO TYPE  
 13854N 08/00 FIRE ALARM REPORTING SYSTEMS - DIGITAL COMMUNICATORS  
 13855N 03/00 ANALOG/ADDRESSABLE INTERIOR FIRE ALARM SYSTEM  
 13856N 03/00 CARBON MONOXIDE DETECTORS  
 13920A 12/01 FIRE PUMPS  
 13920N 09/99 FIRE PUMPS  
 13930A 12/01 WET PIPE SPRINKLER SYSTEM, FIRE PROTECTION  
 13930N 09/99 WET-PIPE FIRE SUPPRESSION SPRINKLERS  
 13931N 09/99 FIRE EXTINGUISHING SPRINKLER SYSTEMS (RESIDENTIAL)  
 13935A 12/01 DRY PIPE SPRINKLER SYSTEM, FIRE PROTECTION  
 13935N 09/99 DRY-PIPE FIRE SPRINKLER SYSTEMS  
 13945A 12/01 PREACTION AND DELUGE SPRINKLER SYSTEMS, FIRE PROTECTION  
 13945N 09/99 [DELUGE] [PREACTION] FIRE SPRINKLER SYSTEMS  
 13955A 12/01 AQUEOUS FILM-FORMING FOAM (AFFF) FIRE PROTECTION SYSTEM  
 13956N 09/99 FOAM FIRE EXTINGUISHING FOR AIRCRAFT HANGARS  
 13957N 09/99 FOAM FIRE EXTINGUISHING FOR FUEL TANK PROTECTION  
 13958N 09/99 FOAM FIRE EXTINGUISHING FOR HAZ/FLAM MATERIAL FACILITY  
 13961N 09/99 CARBON DIOXIDE FIRE EXTINGUISHING (HIGH PRESSURE)  
 13962N 09/99 CARBON DIOXIDE FIRE EXTINGUISHING (LOW PRESSURE)  
 13965A 12/01 WET CHEMICAL FIRE EXTINGUISHING SYSTEM  
 13966N 09/00 HALON 1301 FIRE EXTINGUISHING  
 13971N 09/00 WET CHEMICAL FIRE EXTINGUISHING FOR KITCHEN CABINET  
 13975N 02/01 STANDPIPE SYSTEMS

#### DIVISION 14 - CONVEYING SYSTEMS

14210A 08/01 ELEVATORS, ELECTRIC  
 14210N 03/01 ELECTRIC TRACTION ELEVATORS  
 14211A 01/94 ELEVATORS, ELECTRIC, FOR CIVIL WORKS  
 14240A 08/01 ELEVATORS, HYDRAULIC  
 14240N 03/01 HYDRAULIC ELEVATORS  
 14534N 09/99 MONORAILS WITH MANUAL HOIST  
 14535N 09/99 MONORAILS WITH AIR MOTOR POWERED HOIST  
 14580A 08/01 PNEUMATIC-TUBE SYSTEM  
 14601A 04/94 CRANES, BRIDGE & GANTRY, TOP RUNNING, 30-TON MAXIMUM CAPACITY  
 14602A 08/95 CRANES, SINGLE-GIRDER BRIDGE, MONORAIL AND JIB  
 14606N 09/99 PORTAL CRANE TRACK INSTALLATION  
 14622N 09/99 MONORAILS WITH ELECTRIC POWERED HOISTS  
 14630A 05/93 OVERHEAD ELECTRIC CRANES  
 14636N 09/99 CRANES, OVERHEAD ELECTRIC, TOP RUNNING (UNDER 20,000 POUNDS)  
 14637N 09/99 CRANES, OVERHEAD ELECTRIC, UNDERRUNNING (UNDER 20,000 POUNDS)

#### DIVISION 15 - MECHANICAL

15005A 12/01 SPEED REDUCERS FOR STORM WATER PUMPS  
 15010A 12/01 HYDRAULIC POWER SYSTEMS FOR CIVIL WORKS STRUCTURES  
 15050N 09/01 BASIC MECHANICAL MATERIALS AND METHODS  
 15070A 01/02 SEISMIC PROTECTION FOR MECHANICAL EQUIPMENT  
 15070N 09/99 MECHANICAL SOUND, VIBRATION, AND SEISMIC CONTROL  
 15080A 12/01 THERMAL INSULATION FOR MECHANICAL SYSTEMS  
 15080N 09/99 MECHANICAL INSULATION  
 15081N 09/99 EXTERIOR PIPING INSULATION  
 15131A 12/01 VERTICAL PUMPS, AXIAL-FLOW AND MIXED-FLOW IMPELLER-TYPE

15132A 12/01 SUBMERSIBLE PUMP, AXIAL-FLOW AND MIXED-FLOW TYPE  
 15133A 12/01 DIESEL/NATURAL GAS FUELED ENGINE PUMP DRIVES  
 15181A 12/01 CHILLED AND CONDENSER WATER PIPING AND ACCESSORIES  
 15181N 09/99 CHILLED, CONDENSER, OR DUAL SERVICE WATER PIPING  
 15182A 12/01 REFRIGERANT PIPING  
 15182N 09/99 REFRIGERANT PIPING  
 15183N 09/99 STEAM SYSTEM AND TERMINAL UNITS  
 15184N 09/99 [HIGH][MEDIUM] TEMPERATURE WATER SYSTEM WITHIN BUILDINGS  
 15185N 09/99 LOW TEMPERATURE WATER [LTW] HEATING SYSTEM  
 15190A 12/01 GAS PIPING SYSTEMS  
 15191N 09/99 FIBERGLASS REINFORCED PLASTIC (FRP) PIPING (FOR PETROLEUM)  
 15192N 09/99 FUEL OIL PIPING  
 15193N 09/99 GASOLINE/DIESEL DISPENSING SYSTEMS  
 15194N 10/01 AVIATION FUEL DISTRIBUTION AND DISPENSING  
 15195N 09/99 NATURAL GAS AND LIQUID PETROLEUM PIPING  
 15200A 12/01 PIPELINES, LIQUID PROCESS PIPING  
 15211N 09/99 LOW PRESSURE COMPRESSED AIR PIPING (NON-BREATHING AIR TYPE)  
 15212N 09/99 HIGH AND MEDIUM PRESSURE COMPRESSED AIR PIPING  
 15213N 09/99 LARGE CENTRIFUGAL AIR COMPRESSORS (OVER 200 HP)  
 15214N 09/99 LARGE NONLUBRICATED RECIPROCATING AIR COMPRESSORS (OVER 300 HP)  
 15215N 09/99 NONLUBRICATED ROTARY SCREW AIR COMPRESSORS (100 HP AND LARGER)  
 15216N 09/99 WELDING PRESSURE PIPING  
 15217N 09/99 MEDICAL GAS AND VACUUM PIPING  
 15400A 01/02 PLUMBING, GENERAL PURPOSE  
 15400N 06/01 PLUMBING SYSTEMS  
 15405A 12/01 PLUMBING, HOSPITAL  
 15411N 09/99 HOSPITAL PLUMBING FIXTURES  
 15495A 12/01 HYDRAULIC FLUID POWER SYSTEMS  
 15500A 12/01 DESICCANT COOLING SYSTEMS  
 15501N 09/99 STEAM HEATING PLANT WATERTUBE (SHOP ASSEMBLED) COAL/OIL OR COAL  
 15502N 09/99 STEAM HEATING PLANT WATERTUBE (FIELD ERECTED) COAL/OIL OR COAL  
 15511N 09/99 WATER-TUBE BOILERS, OIL/GAS OR OIL  
 15514N 09/99 LOW PRESSURE WATER HEATING BOILERS (UNDER 800,000 BTU/HR OUTPUT)  
 15515N 09/99 LOW PRESSURE WATER HEATING BOILERS (OVER 800,000 BTU/HR OUTPUT)  
 15516N 09/99 STEAM BOILERS AND EQUIPMENT (500,000 - 18,000,000 BTU/HR)  
 15517N 09/99 STEAM BOILERS AND EQUIPMENT (18,000,000 - 60,000,000 BTU/HR)  
 15532N 09/99 WARM AIR HEATING SYSTEMS  
 15555A 05/01 CENTRAL HIGH TEMPERATURE WATER (HTW) GENERATING PLANT AND AUXILIARIES  
 15556A 07/01 FORCED HOT WATER HEATING SYSTEMS USING WATER AND STEAM HEAT EXCHANGERS  
 15559A 03/89 CENTRAL STEAM-GENERATING SYSTEM, COAL-FIRED  
 15561A 09/01 CENTRAL STEAM-GENERATING SYSTEM - COMBINATION GAS AND OIL FIRED  
 15562A 07/01 HEATING AND UTILITIES SYSTEMS, CENTRAL STEAM  
 15565A 12/01 HEATING SYSTEM; GAS-FIRED HEATERS  
 15566A 12/01 WARM AIR HEATING SYSTEMS  
 15569A 12/01 WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH  
 15601N 05/01 CENTRAL REFRIGERATION EQUIPMENT FOR AIR CONDITIONING  
 15602N 09/99 REFRIGERATION EQUIPMENT FOR COLD STORAGE  
 15620A 12/01 LIQUID CHILLERS  
 15645A 12/01 COOLING TOWER  
 15652A 12/01 COLD STORAGE REFRIGERATION SYSTEMS  
 15690A 12/01 EVAPORATIVE COOLING SYSTEMS  
 15700A 12/01 UNITARY HEATING AND COOLING EQUIPMENT  
 15720N 09/99 AIR HANDLING UNITS  
 15721N 09/99 EVAPORATIVE COOLING SYSTEM  
 15730N 09/99 UNITARY AIR CONDITIONING EQUIPMENT  
 15741 11/99 VERTICAL GROUND-COUPLED HEAT EXCHANGE SYSTEMS (VGCHES)

15741N 08/00 WATER SOURCE HEAT PUMP SYSTEMS  
 15751N 09/99 DESICCANT DEHUMIDIFICATION EQUIPMENT  
 15760N 09/99 TERMINAL HEATING AND COOLING UNITS  
 15768N 09/99 ELECTRIC SPACE HEATING EQUIPMENT  
 15801N 09/99 INDUSTRIAL VENTILATION AND EXHAUST  
 15810N 09/99 DUCTWORK AND DUCTWORK ACCESSORIES  
 15845A 12/01 ENERGY RECOVERY SYSTEMS  
 15846A 12/01 HEAT RECOVERY BOILERS  
 15848A 12/01 THERMAL ENERGY STORAGE UNITS: ICE-ON-COIL  
 15860a 12/01 CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL (CBR) AIR FILTRATION SYSTEM  
 15861N 09/99 MECHANICAL CYCLONE DUST COLLECTOR OF FLUE GAS PARTICULATES  
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# **PART B**

## **UNEDITED OMAHA DISTRICT GUIDE**

### **SPECIFICATIONS**

Part B addresses unedited Omaha District guide specifications required by the RFP. The Contractor is required to edit and incorporate the sections listed below for the 100% Design. These Sections will be made available to the awarded Contractor in electronic form (Specintact). They are presented here in hardcopy form for the Proposer's viewing, since they are not available on a particular website .

SECTION 01356 STORM WATER POLLUTION PREVENTION MEASURES  
SECTION 01565 (FEDERAL FACILITIES COLORADO) NPDES PERMIT  
REQUIREMENTS  
SECTION 02210 GRADING  
SECTION 02440 TRAFFIC SIGNS  
SECTION 02560 (COLORADO) PAVEMENTS FOR SMALL PROJECTS

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**11/01**

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SECTION 01356

STORM WATER POLLUTION PREVENTION MEASURES  
**11/01**

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 448 (1998) Sizes of Aggregate for Road and Bridge Construction

ASTM D 4873 (2001) Identification, Storage, and Handling of Geosynthetic Rolls and Samples

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 288 (2000) Geotextile for Highway Applications

1.2 GENERAL

[The Contractor shall implement the storm water pollution prevention measures specified in this section in a manner which will meet the requirements of Section 01355 ENVIRONMENTAL PROTECTION, and the requirements of the National Pollution Discharge Elimination System (NPDES) permit specified in Section 015\_\_ NPDES PERMIT REQUIREMENTS FOR STORM WATER DISCHARGES FROM CONSTRUCTION SITES.] [The Contractor shall install and maintain stabilization and structural best management practices which will minimize erosion and sediment pollution from the construction site to the extent attainable. The Contractor shall be responsible for selection of appropriate best management practices as specified herein.]

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-07 Certificates

Mill Certificate or Affidavit

1.4 EROSION AND SEDIMENT CONTROLS

The controls and measures required by the Contractor are described [in the Storm Water Pollution Prevention Plans (SWPPP) attached to Section 015\_\_ NPDES PERMIT REQUIREMENTS FOR STORM WATER DISCHARGES FROM CONSTRUCTION

SITES] [below].

#### 1.4.1 Stabilization Practices

The stabilization practices to be implemented may include temporary seeding, mulching, sod stabilization, vegetative buffer strips, erosion control blankets, [protection of trees,] preservation of mature vegetation, etc. On his daily CQC Report, the Contractor shall record the dates when the major grading activities occur; when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated.

##### 1.4.1.1 Permanent Seeding

Disturbed areas of the site where construction activities permanently ceases shall be stabilized with permanent seeding no more than 14 days after the construction activity ceases, except as follows. When the initiation of permanent seeding is stopped due to snow cover or arid conditions, permanent seeding shall be initiated as soon as practicable.

##### 1.4.1.2 Temporary Seeding and Mulching

Areas where construction activities will temporarily cease for more than one year shall be temporarily seeded and mulched. Disturbed areas of the site where construction activities temporarily cease for more than 21 days and less than one year shall be stabilized with either temporary seeding and mulching or mulching not more than 14 days after construction activity ceases, except as follows. When the initiation of temporary stabilization measures is stopped due to snow cover or arid conditions, stabilization measures shall be initiated as soon as practicable.

##### 1.4.1.3 Erosion Control Blankets

Erosion control blanket may be installed on steep slopes and in drainage swales and ditches to protect finished grades from erosion.

#### 1.4.2 Temporary Structural Practices

Temporary structural practices shall be implemented to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable. Temporary structural practices shall be implemented in a timely manner during the construction process to minimize erosion and sediment runoff. Temporary structural practices shall include but not be limited to the following devices. [Location and details of installation and construction are shown on the drawings.]

##### 1.4.2.1 Silt Fences

The Contractor shall provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Silt fences shall be properly installed to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading). Silt fence barriers shall be installed along the down slope boundary of all disturbed areas prior to beginning land-disturbing activities in those areas. Silt fence barriers may be installed across ditches or swales but not where the drainage area is greater than 1 acre. Removal of silt fence barriers shall be approved by the Contracting Officer.

#### 1.4.2.2 Storm Drain Inlet Protection

Storm drain inlet protection shall be installed at each new and existing inlet which receives storm runoff from disturbed areas of 1 acre or less. The protection at each inlet shall be removed once the disturbed area has been finally stabilized.

#### 1.4.2.3 Culvert Inlet Protection

Culvert inlet protection shall be installed at all culverts with a drainage area of 1 acre or less.

#### 1.4.2.4 Rock Check Dams

Rock check dams may be used to reduce erosion of temporary or permanent ditches or swales. Type 1 rock check dams shall be used when the upstream drainage area is less than 2 acres. Type 2 rock check dams shall be used when the upstream area is 2 to 10 acres.

#### 1.4.2.5 Stone Construction Entrance

A stone construction entrance shall be constructed wherever traffic will be leaving the construction site and move directly onto a paved road. Stone construction entrances shall be removed after the site has been finally stabilized.

#### 1.4.2.6 Sediment Trap

Sediment traps may be constructed below disturbed areas where the total contributing drainage area is less than 3 acres. Sediment traps, when used, should be constructed prior to disturbance of upslope areas. Sediment traps must have an initial storage volume of 134 cubic yards per acre of drainage area, half of which shall be in the form of a permanent pool or wet storage to provide a stable settling medium. The remaining half shall be in the form of a drawdown or dry storage which will provide extended settling time during less frequent, larger storm events.

#### 1.4.2.7 Diversion Dikes

Diversion dikes may be constructed to divert runoff from upslope drainage areas away from unprotected disturbed areas and slopes to a stabilized outlet or to divert sediment-laden runoff from a disturbed area to a sediment-trapping facility such as a sediment trap or sediment basin. Diversion dikes shall have a maximum channel slope of 2 percent and shall be adequately compacted to prevent failure. The minimum height measured from the top of the dike to the bottom of the channel shall be 0.5 m. The minimum base width shall be 1.8 m and the minimum top width shall be 0.6 m.

The Contractor shall ensure that the diversion dikes are not damaged by construction operations or traffic.

## PART 2 PRODUCTS

### 2.1 COMPONENTS FOR SILT FENCES

#### 2.1.1 Geotextile

The geotextile shall comply with the requirements of AASHTO M 288 for temporary silt fence.

#### 2.1.2 Silt Fence Stakes and Posts

The Contractor may use either wooden stakes or steel posts for fence construction. Wooden stakes utilized for silt fence construction, shall have a minimum cross section of 50 mm by 50 mm when oak is used and 100 mm by 100 mm when pine is used, and shall have a minimum length of 0.9 m. Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum mass of 1.98 kg per linear meter and a minimum length of 1.5 m.

#### 2.1.3 Mill Certificate or Affidavit

A mill certificate or affidavit shall be provided attesting that the geotextile and factory seams meet chemical, physical, and manufacturing requirements specified above. The mill certificate or affidavit shall specify the actual Minimum Average Roll Values and shall identify the fabric supplied by roll identification numbers. The Contractor shall submit a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the geotextile.

#### 2.1.4 Identification Storage and Handling

Geotextile shall be identified, stored and handled in accordance with ASTM D 4873.

#### 2.1.5 Support Mesh

Support mesh shall be 14-1/2 gage or heavier steel wire with a mesh spacing of 150 by 150 mm or a prefabricated polymeric mesh of equivalent strength.

#### 2.2 Erosion Control Blankets

Erosion control blankets shall be a machine-produced mat with a biodegradable agricultural straw matrix (approximately 0.27 kg/sq m) and photodegradable netting on each side. The blanket shall be sewn together with degradable thread. Installation staple patterns shall be clearly marked on the erosion control blanket with environmentally safe paint.

#### 2.3 COMPONENTS FOR SEDIMENT TRAP

Coarse aggregate shall conform to ASTM D 448, Size 3, 357, or 5. Minor variations from the gradations specified will be permitted. Stone for riprap shall consist of field stone or rough unhewn quarry stone of approximately rectangular shape. The stone shall be hard and angular and of such quality that it will not disintegrate on exposure to water or weathering. The specific gravity of individual stones shall be at least 2.5. Riprap stones shall weigh between 23 and 68 kg each, except that approximately 10 percent may weigh 23 kg or less. At least 60 percent shall weigh more than 45 kg. Geotextile shall conform to paragraph GEOTEXTILES.

#### 2.4 COMPONENTS FOR INLET PROTECTION

Aggregates for gravel filter should be sized to get the greatest amount of filtering action possible (by using smaller-sized stone), while not creating significant ponding problems.

#### 2.5 STONE CONSTRUCTION ENTRANCE

Aggregate for construction entrance shall conform to ASTM D 448, Size 1. Minor variations from the gradation specified will be permitted. Geotextile shall conform to paragraph GEOTEXTILES.

## 2.6 ROCK CHECK DAMS

Coarse aggregate shall conform to ASTM D 448 size number 1 or approved equal. Riprap shall consist of field stone or rough unhewn quarry stone of approximately rectangular shape. Riprap shall be hard and angular. The specific gravity of individual stones shall be at least 2.5. Concrete rubble may be used provided it has a density of at least . Individual stones shall have a weight of 23 kg to 68 kg except that a maximum of 10 percent of stone may weigh less than 50 lbs. At least 60 percent of stones shall weigh more than 45 kg.

## 2.7 GEOTEXTILES

Geotextile for other than silt fence shall comply with the requirements of AASHTO M 288 for a separation geotextile.

## PART 3 EXECUTION

### 3.1 INSTALLATION OF SILT FENCES

Silt fences shall extend a minimum of 400 mm above the ground surface and shall not exceed 860 mm above the ground surface. Filter fabric shall be from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, filter fabric shall be spliced together at a support post, with a minimum 150 mm overlap, and securely sealed. A trench shall be excavated approximately 150 mm wide and 200 mm deep on the upslope side of the location of the silt fence. The 150 mm by 200 mm trench shall be backfilled and the soil compacted over the filter fabric. Silt fences shall be removed upon approval by the Contracting Officer.

### 3.2 Sediment Trap

The area under the embankment shall be cleared, grubbed, and stripped of any vegetation and root mat. Fill material for the embankment shall be placed in accordance with Section 02300 EARTHWORK. A geotextile shall be placed between the riprap and subgrade.

### 3.3 Stone Construction Entrance

The area of the entrance shall be cleared of all vegetation, roots, and other objectionable material. The aggregate layer shall have a minimum total thickness of 150 mm. A geotextile shall be placed beneath aggregate for the full width and length of the entrance. A minimum of 75 mm of the aggregate shall be placed in a cut section to provide stability and secure the geotextile. If conditions on the site are such that the majority of the mud is not removed by the vehicles traveling over the stone, then the tires of the vehicles shall be washed before entering the road. Wash water must be carried away from the entrance to an approved settling area to remove sediment. A wash rack may also be installed for washing of vehicles.

### 3.4 MAINTENANCE

The Contractor shall maintain the temporary and permanent vegetation,

erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. [Maintenance of protective measures shall conform to the requirements in the SWPPP.] [The following procedures shall be followed to maintain the protective measures.]

#### 3.4.1 Silt Fences

Silt fences shall be inspected in accordance with paragraph INSPECTIONS. Any required repairs shall be made promptly. Close attention shall be paid to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits shall be removed when deposits reach one-third of the height of the barrier. When a silt fence is no longer required, it shall be removed. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be seeded in accordance with Section 02921 SEEDING.

#### 3.4.2 Storm Drain Inlet Protection

Inlet protection structures shall be inspected after each rainfall and repairs made as needed. Sediment shall be removed and the trap restored to its original dimensions when the sediment has accumulated to one half the design depth.

#### 3.4.3 Rock Check Dams

Check dams should be checked for sediment after each runoff-producing storm event. Sediment should be removed when it reaches one half the original height of the measure.

#### 3.4.4 Stone Construction Entrance

Stone construction entrances shall be maintained in a condition which will prevent tracking or flow of mud onto paved roads. This may require periodic top dressing with additional stone or the washing and reworking of existing stone as conditions demand and repair and/or cleanout of any structures used to trap sediment. The use of water trucks to remove materials dropped, washed, or tracked onto roadways will not be permitted under any circumstances.

#### 3.4.5 Sediment Traps

Sediment shall be removed and the trap restored to its original dimensions when the sediment has accumulated to one half the design volume of the wet storage. Filter stone shall be regularly checked to ensure that filtration performance is maintained. Stone choked with sediment shall be removed and cleaned or replaced. The structure should be inspected regularly to ensure that it is structurally sound and has not been damaged by erosion or construction equipment. The height of the stone outlet should be inspected to ensure that its center is at least 0.3 m below the top of the embankment.

#### 3.4.6 Diversion Dikes

Diversion dikes shall be inspected in accordance with paragraph INSPECTIONS. Close attention shall be paid to the repair of damaged diversion dikes and necessary repairs shall be accomplished promptly. When diversion dikes are no longer required, they shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be seeded in accordance with Section 02921 SEEDING.

### 3.5 INSPECTIONS

#### 3.5.1 General

The Contractor shall inspect disturbed areas of the construction site, areas used for storage of materials that are exposed to precipitation that have not been finally stabilized, stabilization practices, structural practices, other controls, and area where vehicles exit the site at least once every seven (7) calendar days and within 24 hours of the end of any storm that produces 13 mm or more rainfall at the site. Where sites have been finally stabilized, such inspection shall be conducted at least once every month. [Inspection of protective measures shall conform to the requirements in the SWPPP.]

#### 3.5.2 Inspections Details

Disturbed areas and areas used for material storage that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures shall be observed to ensure that they are operating correctly. Discharge locations or points shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles exit the site shall be inspected for evidence of offsite sediment tracking.

#### 3.5.3 Inspection Reports

For each inspection conducted, the Contractor shall prepare a report summarizing the scope of the inspection, name(s) of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the storm water pollution prevention measures, maintenance performed, and actions taken. The report shall be furnished to the Contracting Officer within 24 hours of the inspection as a part of the Contractor's daily CQC REPORT.

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SECTION 01565

(FEDERAL FACILITIES COLORADO) NPDES PERMIT REQUIREMENTS FOR STORM WATER  
DISCHARGES FROM CONSTRUCTION SITES

**03/01**

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SECTION 01565

(FEDERAL FACILITIES COLORADO) NPDES PERMIT REQUIREMENTS  
FOR STORM WATER DISCHARGES  
FROM CONSTRUCTION SITES  
**03/01**

Attachments: Endangered Species/Critical Habitat Letter of  
Determination  
Storm Water General Permit For Construction Activities  
Notice of Intent  
Notice of Termination

PART 1 GENERAL

1.1 REFERENCES (Not Applicable)

1.2 SUBMITTALS (Not Applicable)

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall be responsible for implementing the terms and requirements of the attached Storm Water General Permit For Construction Activities (Permit No. COR10\*##F) as specified below. The Government and the Contractor shall be considered co-permittees. The Government has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications. The Contractor shall have day-to-day operational control of those activities which are necessary to ensure compliance with the requirements specified herein. The Government shall be responsible for all submissions to the EPA. The Government shall retain the official copy of all documents pertaining to compliance with the permit during construction. The project site is not located in designated critical habitat and there are no known "listed species" located in the project area.

3.2 IMPLEMENTATION

3.2.1 Notice of Intent

The Contractor shall complete and sign a Notice of Intent (NOI) in accordance with NPDES Permit No. COR10\*##F. The Contractor's NOI shall be furnished to the Contracting Officer at least 7 calender days prior to the commencement of construction activities. The Government shall submit the Contractor's and Government's NOI's to the EPA. The Government will not submit the NOI's to the EPA until the Storm Water Pollution Prevention Plan has been accepted. The Contractor may not begin land disturbance activities until authorized by the Contracting Officer. The Status of Owner/Operator shall be "F" for both the Contractor and the Government. The Contractor shall check the box marked (d) concerning eligibility with regard to protection of endangered species.

### 3.2.2 Storm Water Pollution Prevention Plan

#### 3.2.2.1 General

The Contractor shall be responsible for preparing the Storm Water Pollution Prevention Plan (SWPPP). The Contractor shall be responsible for implementing, maintaining and updating the SWPPP (including Site Map) during construction. Unless otherwise indicated, the Contractor shall be responsible for implementing all measures described in the SWPPP. The Contractor shall maintain the following records and attach to the SWPPP: the dates when major grading activities occur; the dates when construction activities temporarily or permanently cease on a portion of the site; and the dates when stabilization measures are initiated. The Government shall keep the official plan at the site. The SWPPP shall be signed by the Government and the Contractor. If major changes to the SWPPP are required during construction, the SWPPP shall be recertified by the Government and the Contractor.

#### 3.2.2.2 Acceptance of SWPPP

Acceptance of the SWPPP is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes to the SWPPP if the Contracting Officer determines that environmental protection requirements are not being met.

#### 3.2.2.3 Notification of Changes

After acceptance of the SWPPP, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

#### 3.2.3 Posting Notice

The Contractor shall indicate the NPDES permit number, name and telephone number of a local contact person, and a brief description of the project near the main entrance of the construction site in accordance with Part IV.B.2 of the general permit.

#### 3.2.4 Inspections and Reporting

The Contractor shall be responsible for all inspections specified in the SWPPP and the general permit. The Contractor shall also prepare and sign all reports summarizing the inspections as required by the SWPPP and the general permit. Copies of inspection reports shall be furnished to the Contracting Officer for attachment to the SWPPP no more than 2 days after each inspection. The Contractor shall notify the Contracting Officer within 24 hours if an inspection identifies any incidents of non-compliance with the SWPPP and the general permit.

#### 3.2.5 Maintenance

The Contractor shall be responsible for maintaining all erosion and sediment control measures and other protective measures identified in the SWPPP in an effective operating condition. The Government reserves the right to require the Contractor to perform maintenance on erosion and sediment control measures and other protective measures if the Contracting Officer determines that environmental protection requirements are not being

met.

### 3.2.6 Notice of Termination

The Contractor shall notify the Contracting Officer within 24 hours after final stabilization on all portions of the site has been achieved in accordance with Part I.D.2. of the permit. The Contractor shall complete and sign a Notice of Termination (NOT) in accordance with NPDES Permit No. COR10\*##F. The Contractor's NOT shall be furnished to the Contracting Officer within 5 calendar days after final stabilization (as defined in the permit) has been achieved on all portions of the site. The Government shall submit the Contractor's and Government's NOTs to the EPA.

### 3.2.7 Retention of Records

The Government shall be responsible for retaining copies of the SWPPP and all reports in accordance with NPDES Permit No. COR10\*##F.

### 3.2.8 Continuation of Expired Permit

If the current NPDES general permit expires prior to completion of construction, the Contractor shall comply with the conditions of the new permit.

-- End of Section --

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION VIII  
999 18TH STREET, SUITE 500  
DENVER, COLORADO 80202-2466

STORM WATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITIES

*For Federal Facilities in the State of Colorado, except those located on Indian Country Lands*

AUTHORIZATION TO DISCHARGE UNDER THE  
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et seq.), except as provided in Part I.B.3 of this permit, operators of construction activities located in an area specified in Part I.A. and who submit a Notice of Intent in accordance with Part II, are authorized to discharge pollutants to waters of the United States in accordance with the conditions and requirements set forth herein.

This permit shall become effective on February 17, 1998

This permit and the authorization to discharge shall expire at midnight, February 17, 2003

Signed and issued this 15th day of January, 1998

  
Authorized Permitting Official

Kerrigan G. Clough, Assistant Regional Administrator  
Office of Pollution Prevention, State and Tribal Assistance  
Title

**NOTE-THIS PAGE WILL BE REPLACED BY COPY OF SIGNED PAGE**

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION VIII  
999 18TH STREET, SUITE 500  
DENVER, COLORADO 80202-2466

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# NPDES GENERAL PERMIT FOR STORM WATER DISCHARGES FROM CONSTRUCTION ACTIVITIES

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## **Preface**

EPA's reissued construction general permits (CGP) were published in the Federal Register on February 17, 1998 (see 63 FR 7857). That document included the conditions for 38 separate permits involving 7 different Regions of EPA. Seven of those permits involve EPA Region VIII and this permit is one of them. In order to make this permit easier to read and understand, it has been reformatted from the style used in the Federal Register and limited to conditions and information that only apply to the area covered by this permit. References, conditions and information pertaining to all other Regions, States and Tribes that were included in the Federal Register, but not applicable to the areas covered by this permit, were removed. The conditions in this permit mimic the permits published in the Federal Register in all other ways. Persons that want CGP information for areas not covered by this permit should refer to the February 17, 1998 Federal Register or one of the other permits prepared by EPA Region VIII.

## **Part I. COVERAGE UNDER THIS PERMIT**

### **A. Permit Area.**

**Federal Facilities in the State of Colorado, except those located on Indian Country lands.**

### **B. Eligibility.**

1. Permittees are authorized to discharge pollutants in storm water runoff associated with construction activities as defined in 40 CFR 122.26(b)(14)(x) and those construction site discharges designated by the Director as needing a storm water permit under 122.26(a)(1)(v) or under 122.26(a)(9) and 122.26(g)(1)(i). Discharges identified under Part I.B.3 are excluded from coverage. Any discharge authorized by a different NPDES permit may be commingled with discharges authorized by this permit.
2. This permit also authorizes storm water discharges from support activities (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided:
  - a. the support activity is directly related to a construction site that is required to have NPDES permit coverage for discharges of storm water associated with construction activity;
  - b. the support activity is not a commercial operation serving multiple unrelated construction projects by different operators, and does not operate beyond the completion of the construction activity at the last construction project it supports; and
  - c. appropriate controls and measures are identified in a storm water pollution prevention plan covering the discharges from the support activity areas.

**3. Limitations on Coverage.**

- a. Post Construction Discharges. This permit does not authorize storm water discharges that originate from the site after construction activities have been completed and the site, including any temporary support activity site, has undergone final stabilization. Industrial post-construction storm water discharges may need to be covered by a separate NPDES permit.
- b. Discharges Mixed with Non-Storm Water. This permit does not authorize discharges that are mixed with sources of non-storm water, other than those discharges which are identified in Part III.A.2. or 3. (exceptions to prohibition on non-storm water discharges) and are in compliance with Part IV.D.5 (non-storm water discharges).
- c. Discharges Covered by Another Permit. This permit does not authorize storm water discharges associated with construction activity that have been covered under an individual permit or required to obtain coverage under an alternative general permit in accordance with Part VI.L.
- d. Discharges Threatening Water Quality. This permit does not authorize storm water discharges from construction sites that the Director (EPA) determines will cause, or have reasonable potential to cause or contribute to, violations of water quality standards. Where such determinations have been made, the Director may notify the operator(s) that an individual permit application is necessary in accordance with Part VI.L. However, the Director may authorize coverage under this permit after appropriate controls and implementation procedures designed to bring the discharges into compliance with water quality standards have been included in the storm water pollution prevention plan;
- e. Storm water discharges and storm water discharge-related activities that are not protective of Federally listed endangered and threatened ("listed") species or designated critical habitat ("critical habitat").
  - (1) For the purposes of complying with the Part I.B.3.e. eligibility requirements, "storm water discharge-related activities" include:
    - (a) activities which cause, contribute to, or result in point source storm water pollutant discharges, including but not limited to: excavation, site development, grading and other surface disturbance activities; and
    - (b) measures to control storm water including the siting, construction and operation of best management practices (BMPs) to control, reduce or prevent storm water pollution.
  - (2) Coverage under this permit is available only if the applicant certifies that it meets at least one of the criteria in paragraphs (a)-(d) below. Failure to continue to meet one of these criteria during the term of the permit will render a permittee ineligible for coverage under this permit.
    - (a) The storm water discharges and storm water discharge-related activities are not likely to adversely affect listed species or critical habitat; or
    - (b) Formal or informal consultation with the Fish and Wildlife Service and/or the National Marine Fisheries Service (the "Services") under section 7 of the Endangered Species Act (ESA) has been concluded which addresses the effects of the applicant's storm water discharges and storm water discharge-related activities on listed species and critical

**3. Limitations on Coverage. (Continued)**

habitat and the consultation results in either a no jeopardy opinion or a written concurrence by the Service(s) on a finding that the applicant's storm water discharges and storm water discharge-related activities are not likely to adversely affect listed species or critical habitat. A section 7 consultation may occur in the context of another Federal action (e.g., a ESA section 7 consultation was performed for issuance of a wetlands dredge and fill permit for the project, or as part of a National Environmental Policy Act (NEPA) review); or

- (c) The applicant's construction activities are authorized under section 10 of the ESA and that authorization addresses the effects of the applicant's storm water discharges and storm water discharge-related activities on listed species and critical habitat; or
  - (d) The applicant's storm water discharges and storm water discharge-related activities were already addressed in another operator's certification of eligibility under Part I.B.3.e.(2)(a), (b), or (c) which included the applicant's project area. By certifying eligibility under Part I.B.3.e.(2)(d), the applicant agrees to comply with any measures or controls upon which the other operator's certification under Part I.B.3.e.(2)(a), (b) or (c) was based.
- (3) All applicants must follow the procedures provided at Addendum A of this permit when applying for permit coverage.
  - (4) The applicant must comply with any applicable terms, conditions or other requirements developed in the process of meeting eligibility requirements of Part I.B.3.e.(2)(a), (b), (c), or (d) above to remain eligible for coverage under this permit. Such terms and conditions must be incorporated in the applicant's storm water pollution prevention plan.
  - (5) Applicants who choose to conduct informal consultation to meet the eligibility requirements of Part I.B.3.e.(2)(b) are automatically designated as non-Federal representatives under this permit. See 50 CFR 402.08. Applicants who choose to conduct informal consultation as a non-Federal representatives must notify EPA and the appropriate Service office in writing of that decision.
  - (6) This permit does not authorize any storm water discharges where the discharges or storm water discharge-related activities cause prohibited "take" (as defined under section 3 of the Endangered Species Act and 50 CFR 17.3) of endangered or threatened species unless such takes are authorized under sections 7 or 10 of the Endangered Species Act.
  - (7) This permit does not authorize any storm water discharges where the discharges or storm water discharge-related activities are likely to jeopardize the continued existence of any species that are listed or proposed to be listed as endangered or threatened under the ESA or result in the adverse modification or destruction of habitat that is designated or proposed to be designated as critical under the ESA.
- f. Storm water Discharges and Storm Water Discharge-Related Activities with Unconsidered Adverse Effects on Historic Properties. (Reserved)

**C. Obtaining Authorization.**

1. In order for storm water discharges from construction activities to be authorized under this general permit, an operator must:
  - a. meet the Part I.B eligibility requirements;
  - b. except as provided in Parts II.A.5 and II.A.6, develop a storm water pollution prevention plan (SWPPP) covering either the entire site or all portions of the site for which they are operators (see definition in Part IX.N) according to the requirements in Part IV. A "joint" SWPPP may be developed and implemented as a cooperative effort where there is more than one operator at a site; and
  - c. submit a Notice of Intent (NOI) in accordance with the requirements of Part II, using an NOI form provided by the Director (or a photocopy thereof, see Addendum C, page 45). Only one NOI need be submitted to cover all of the permittee's activities on the common plan of development or sale (e.g., you do not need to submit a separate NOI for each separate lot in a residential subdivision or for two separate buildings being constructed at a manufacturing facility, provided your SWPPP covers each area for which you are an operator). The SWPPP must be implemented upon commencement of construction activities.
2. Any new operator on site, including those who replace an operator who has previously obtained permit coverage, must submit an NOI to obtain permit coverage.
3. Unless notified by the Director to the contrary, operators who submit a correctly completed NOI in accordance with the requirements of this permit are authorized to discharge storm water from construction activities under the terms and conditions of this permit two (2) days after the date that the NOI is postmarked. The Director may deny coverage under this permit and require submittal of an application for an individual NPDES permit based on a review of the NOI or other information (see Part VI.L).

**D. Terminating Coverage.**

1. Permittees wishing to terminate coverage under this permit must submit a Notice of Termination (NOT) in accordance with Part VIII of this permit (see Addendum D, page 47). Compliance with this permit is required until an NOT is submitted. The permittee's authorization to discharge under this permit terminates at midnight of the day the NOT is signed.
2. All permittees must submit an NOT within thirty (30) days after one or more of the following conditions have been met:
  - a. final stabilization (see definition Part IX.I) has been achieved on all portions of the site for which the permittee is responsible (including if applicable, returning agricultural land to its pre-construction agricultural use);
  - b. another operator/permittee has assumed control according to Part VI.G.2.c. over all areas of the site that have not been finally stabilized; or

**D. Terminating Coverage.** (Continued)

- c. for residential construction only, temporary stabilization has been completed and the residence has been transferred to the homeowner.

Enforcement actions may be taken if a permittee submits an NOT without meeting one or more of these conditions.

**Part II. NOTICE OF INTENT REQUIREMENTS**

**A. Deadlines for Notification.**

1. Except as provided in Parts II.A.3, II.A.4, II.A.5 or II.A.6 below, parties defined as operators (see definition in Part IX.N) due to their operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications, must submit a Notice of Intent (NOI) in accordance with the requirements of this Part at least two (2) days prior to the commencement of construction activities (i.e., the initial disturbance of soils associated with clearing, grading, excavation activities, or other construction activities).
2. Except as provided in Parts II.A.3, II.A.4, II.A.5 or II.A.6 below, parties defined as operators (see definition in Part IX.N) due to their day-to-day operational control over activities at a project which are necessary to ensure compliance with a storm water pollution prevention plan or other permit conditions (e.g., general contractor, erosion control contractor) must submit an NOI at least two (2) days prior to commencing work on-site.
3. For storm water discharges from construction projects where the operator changes, including instances where an operator is added after an NOI has been submitted under Parts II.A.1 or II.A.2, the new operator must submit an NOI at least two (2) days before assuming operational control over site specifications or commencing work on-site.
4. Operators are not prohibited from submitting late NOIs. When a late NOI is submitted, authorization is only for discharges that occur after permit coverage is granted. The Agency reserves the right to take appropriate enforcement actions for any unpermitted activities that may have occurred between the time construction commenced and authorization of future discharges is granted (typically 2 days after a complete NOI is submitted).
5. Operators of on-going construction projects as of the effective date of this permit which received authorization to discharge for these projects under the 1992 baseline construction general permit must:
  - a. submit an NOI according to Part II.B. within 90 days of the effective date of this permit. If the permittee is eligible to submit a Notice of Termination (e.g., construction is finished and final stabilization has been achieved) before the 90th day, a new NOI is not required to be submitted;
  - b. for the first 90 days from the effective date of this permit, comply with the terms and conditions of the 1992 baseline construction general permit they were previously authorized under; and
  - c. update their storm water pollution prevention plan to comply with the requirements of Part IV within 90 days after the effective date of this permit.

**A. Deadlines for Notification. (Continued)**

6. Operators of on-going construction projects as of the effective date of this permit which did **not** receive authorization to discharge for these projects under the 1992 baseline construction general permit must:
  - a. prepare and comply with an interim storm water pollution prevention plan in accordance with the 1992 baseline construction general permit prior to submitting an NOI;
  - b. submit a NOI according to Part II.B; and
  - c. update their storm water pollution prevention plan to comply with the requirements of Part IV within 90 days after the effective date of this permit.

**B. Contents of Notice of Intent (NOI).**

1. The NOI form shall be signed in accordance with Part VI.G of this permit and shall include the following information:

- a. the name, address, and telephone number of the operator filing the NOI for permit coverage;
- b. an indication of whether the operator is a Federal, State, Tribal, private, or other public entity;

*NOTE: All projects on Federal Facilities in Colorado must have an "F" in the Status of Owner/Operator box on the NOI. Even private contracting companies must put an "F" in that box so that we can tell its a Federal Facility project, thus regulated by EPA not the State of Colorado.*

- c. the name (or other identifier), address, county, and latitude/longitude of the construction project or site;
- d. an indication of whether the project or site is located on Indian Country lands;
- e. confirmation that a storm water pollution prevention plan (SWPPP) has been developed or will be developed prior to commencing construction activities, and that the SWPPP will be compliant with any applicable local sediment and erosion control plans. Copies of SWPPPs or permits should **not** be included with the NOI submission;
- f. optional information: the location where the SWPPP may be viewed and the name and telephone number of a contact person for scheduling viewing times;
- g. the name of nearest named the receiving water(s);
- h. estimates of project start and completion dates, and estimates of the number of acres of the site on which soil will be disturbed (if less than 1 acre, enter "1");
- i. based on the instructions in Addendum A, whether any listed or proposed threatened or endangered species, or designated critical habitat, are in proximity to the storm water discharges or storm water discharge-related activities to be covered by this permit; and

**B. Contents of Notice of Intent (NOI). (Continued)**

- j. under which section(s) of Part I.B.3.e. (Endangered Species) the applicant is certifying eligibility.

Note that as of the effective date of this permit, reporting of information relating to the preservation of historic properties has been reserved and is not required at this time. Such reservation in no way relieves applicants or permittees from any otherwise applicable obligations or liabilities related to historic preservation under State, Tribal or local law. After further discussions between EPA and the Advisory Council on Historic Preservation, the Agency may modify the permit. Any such modification may affect future Notice of Intent reporting requirements.

**C. Where to Submit.**

1. NOIs must be signed in accordance with Part VI.G. and sent to the following address:

Storm Water Notice of Intent (4203)  
US EPA  
401 M. Street, SW  
Washington, D.C. 20460

***Part III. SPECIAL CONDITIONS, MANAGEMENT PRACTICES, AND OTHER NON-NUMERIC LIMITATIONS***

**A. Prohibition on Non-Storm Water Discharges.**

1. Except as provided in Parts I.B.2 or 3 and III.A.2 or 3, all discharges covered by this permit shall be composed entirely of storm water associated with construction activity.
2. Discharges of material other than storm water that are in compliance with an NPDES permit (other than this permit) issued for that discharge may be discharged or mixed with discharges authorized by this permit.
3. The following non-storm water discharges from active construction sites are authorized by this permit provided the non-storm water component of the discharge is in compliance with Part IV.D.5 (non-storm water discharges): discharges from fire fighting activities; fire hydrant flushings; waters used to wash vehicles where detergents are not used; water used to control dust in accordance with Part IV.D.2.c.(2); potable water sources including waterline flushings; routine external building wash down which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; uncontaminated ground water or spring water; and foundation or footing drains where flows are not contaminated with process materials such as solvents.

**B. Releases in Excess of Reportable Quantities.** The discharge of hazardous substances or oil in the storm water discharge(s) from a facility shall be prevented or minimized in accordance with the applicable storm water pollution prevention plan for the facility. This permit does not relieve the permittee of the reporting requirements of 40 CFR 110, 40 CFR 117 and 40 CFR 302. Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR 110, 40 CFR 117 or 40 CFR 302, occurs during a 24 hour period:

1. The permittee is required to notify the National Response Center (NRC) (800-424-8802; in the Washington, DC, metropolitan area call 202-426-2675) in accordance with the requirements of 40 CFR 110, 40 CFR 117 and 40 CFR 302 as soon as he or she has knowledge of the discharge;
2. The storm water pollution prevention plan required under Part IV of this permit must be modified within 14 calendar days of knowledge of the release to: provide a description of the release, the circumstances leading to the release, and the date of the release. In addition, the plan must be reviewed to identify measures to prevent the reoccurrence of such releases and to respond to such releases, and the plan must be modified where appropriate.

**C. Spills.** This permit does not authorize the discharge of hazardous substances or oil resulting from an on-site spill.

**D. Discharge Compliance with Water Quality Standards.** Operators seeking coverage under this permit shall not be causing or have the reasonable potential to cause or contribute to a violation of a water quality standard. Where a discharge is already authorized under this permit and is later determined to cause or have the reasonable potential to cause or contribute to the violation of an applicable water quality standard, the Director will notify the operator of such violation(s). The permittee shall take all necessary actions to ensure future discharges do not cause or contribute to the violation of a water quality standard and document these actions in the storm water pollution prevention plan. If violations remain or



**D. Discharge Compliance with Water Quality Standards.** (Continued)

re-occur, then coverage under this permit may be terminated by the Director, and an alternative general permit or individual permit may be issued. Compliance with this requirement does not preclude any enforcement activity as provided by the Clean Water Act for the underlying violation.

**E. Responsibilities of Operators.** Permittees may meet one or both of the operational control components in the definition of "operator" found in Part IX.N. Either Parts III.E.1 or III.E.2 or both will apply depending on the type of operational control exerted by an individual permittee. Part III.E.3 applies to all permittees.

1. Permittees with operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications (e.g., developer or owner), must:
  - a. ensure the project specifications that they develop meet the minimum requirements of Part IV (Storm Water Pollution Prevention Plans (SWPPP)) and all other applicable conditions;
  - b. ensure that the SWPPP indicates the areas of the project where they have operational control over project specifications (including the ability to make modifications in specifications), and ensure all other permittees implementing portions of the SWPPP impacted by any changes they make to the plan are notified of such modifications in a timely manner; and
  - c. ensure that the SWPPP for portions of the project where they are operators indicates the name and NPDES permit number for parties with day-to-day operational control of those activities necessary to ensure compliance with the SWPPP or other permit conditions. If these parties have not been identified at the time the SWPPP is initially developed, the permittee with operational control over project specifications shall be considered to be the responsible party until such time as the authority is transferred to another party (e.g., general contractor) and the plan updated.
2. Permittee(s) with day-to-day operational control of those activities at a project which are necessary to ensure compliance with a SWPPP for the site or other permit conditions (e.g., general contractor) must:
  - a. ensure that the SWPPP for portions of the project where they are operators meets the minimum requirements of Part IV (Storm Water Pollution Prevention Plan) and identifies the parties responsible for implementation of control measures identified in the plan;
  - b. ensure that the SWPPP indicates areas of the project where they have operational control over day-to-day activities;
  - c. ensure that the SWPPP for portions of the project where they are operators indicates the name and NPDES permit number of the party(ies) with operational control over project specifications (including the ability to make modifications in specifications);
3. Permittees with operational control over only a portion of a larger construction project (e.g., one of four homebuilders in a subdivision) are responsible for compliance with all applicable terms and conditions of this permit as it relates to their activities on their portion of the construction site, including protection of endangered species and implementation of BMPs and other controls required by the SWPPP. Permittees shall ensure either directly or through coordination with other permittees, that their activities do not render another party's pollution controls ineffective. Permittees must either implement their portions of a common SWPPP or develop and implement their own SWPPP.

***Part IV. STORM WATER POLLUTION PREVENTION PLANS***

At least one storm water pollution prevention plan (SWPPP) shall be developed for each construction project or site covered by this permit. For more effective coordination of BMPs and opportunities for cost sharing, a cooperative effort by the different operators at a site to prepare and participate in a comprehensive SWPPP is encouraged. Individual operators at a site may, but are not required, to develop separate SWPPPs that cover only their portion of the project provided reference is made to other operators at the site. In instances where there is more than one SWPPP for a site, coordination must be conducted between the permittees to ensure the storm water discharge controls and other measures are consistent with one another (e.g., provisions to protect listed species and critical habitat).

Storm water pollution prevention plans shall be prepared in accordance with good engineering practices. The SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges from the construction site. The SWPPP shall describe and ensure the implementation of practices which will be used to reduce the pollutants in storm water discharges associated with construction activity at the construction site and assure compliance with the terms and conditions of this permit.

When developing SWPPPs, applicants must follow the procedures in Addendum A of this permit to determine whether listed endangered or threatened species or critical habitat would be affected by the applicant's storm water discharges or storm water discharge-related activities. Any information on whether listed species or critical habitat are found in proximity to the construction site must be included in the SWPPP. Any terms or conditions that are imposed under the eligibility requirements of Part I.B.3.e and Addendum A of this permit to protect listed species or critical habitat from storm water discharges or storm water discharge-related activity must be incorporated into the SWPPP. Permittees must implement the applicable provisions of the SWPPP required under this part as a condition of this permit.

**A. Deadlines for Plan Preparation and Compliance.** The storm water pollution prevention plan shall:

1. be completed prior to the submittal of an NOI to be covered under this permit (except as provided in Parts II.A.5 and II.A.6) updated as appropriate; and
2. provide for compliance with the terms and schedule of the SWPPP beginning with the initiation of construction activities.

**B. Signature, Plan Review and Making Plans Available.**

1. The SWPPP shall be signed in accordance with Part VI.G, and be retained on-site at the facility which generates the storm water discharge in accordance with Part V (Retention of Records) of this permit.
2. The permittee shall post a notice near the main entrance of the construction site with the following information:
  - a. the NPDES permit number for the project or a copy of the NOI if a permit number has not yet been assigned;
  - b. the name and telephone number of a local contact person;
  - c. a brief description of the project; and

**B. Signature, Plan Review and Making Plans Available. (Continued)**

- d. the location of the SWPPP if the site is inactive or does not have an on-site location to store the plan.

If posting this information near a main entrance is infeasible due to safety concerns, the notice shall be posted in a local public building. If the construction project is a linear construction project (e.g., pipeline, highway, etc.), the notice must be placed in a publicly accessible location near where construction is actively underway and moved as necessary. This permit does not provide the public with any right to trespass on a construction site for any reason, including inspection of a site; nor does this permit require that permittees allow members of the public access to a construction site.

3. The permittee shall make SWPPPs available upon request to the Director, a State, Tribal or local agency approving sediment and erosion plans, grading plans, or storm water management plans; local government officials; or the operator of a municipal separate storm sewer receiving discharges from the site. The copy of the SWPPP that is required to be kept on-site or locally available must be made available to the Director for review at the time of an on-site inspection. Also, in the interest of public involvement, EPA encourages permittees to make their SWPPPs available to the public for viewing during normal business hours.
4. The Director may notify the permittee at any time that the SWPPP does not meet one or more of the minimum requirements of this Part. Such notification shall identify those provision of this permit which are not being met by the SWPPP as well as those requiring modification in order to meet the minimum requirements of this Part. Within seven (7) calendar days of receipt of such notification from the Director (or as otherwise provided by the Director), the permittee shall make the required changes to the SWPPP and shall submit to the Director a written certification that the requested changes have been made. The Director may take appropriate enforcement action for the period of time the permittee was operating under a plan that did not meet the minimum requirements of this permit.

**C. Keeping Plans Current. The permittee must amend the storm water pollution prevention plan whenever:**

1. There is a change in design, construction, operation, or maintenance which has a significant effect on the discharge of pollutants to the waters of the United States which has not been addressed in the SWPPP; or
2. Inspections or investigations by site operators, local, State, Tribal or Federal officials indicate the SWPPP is proving ineffective in eliminating or significantly minimizing pollutants from sources identified under Part IV.D.1 of this permit, or is otherwise not achieving the general objectives of controlling pollutants in storm water discharges associated with construction activity.

**D. Contents of Plan. The storm water pollution prevention plan (SWPPP) shall include the following items:**

1. **Site Description.** Each SWPPP shall provide a description of potential pollutant sources and other information as indicated below:
  - a. a description of the nature of the construction activity;

**1. Site Description. (Continued)**

- b. a description of the intended sequence of major activities which disturb soils for major portions of the site (e.g., grubbing, excavation, grading, utilities and infrastructure installation);
- c. estimates of the total area of the site and the total area of the site that is expected to be disturbed by excavation, grading, or other activities including off-site borrow and fill areas;
- d. an estimate of the runoff coefficient of the site for both the pre-construction and post-construction conditions and data describing the soil or the quality of any discharge from the site;
- e. a general location map (e.g., a portion of a city or county map) and a site map indicating the following: drainage patterns and approximate slopes anticipated after major grading activities; areas of soil disturbance; areas which will not be disturbed; locations of major structural and nonstructural controls identified in the SWPPP; locations where stabilization practices are expected to occur; locations of off-site material, waste, borrow or equipment storage areas; surface waters (including wetlands); and locations where storm water discharges to a surface water;
- f. location and description of any discharge associated with industrial activity other than construction, including storm water discharges from dedicated asphalt plants and dedicated concrete plants, which is covered by this permit;
- g. the name of the receiving water(s) and the areal extent and description of wetland or other special aquatic sites (as described under 40 CFR 230.3(q-1)) at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project;
- h. a copy of the permit requirements (attaching a copy of this permit is acceptable); and
- i. information on whether listed endangered or threatened species, or critical habitat, are found in proximity to the construction activity and whether such species may be affected by the applicant's storm water discharges or storm water discharge-related activities.

- 2. Controls.** Each SWPPP shall include a description of appropriate control measures (i.e., BMPs) that will be implemented as part of the construction activity to control pollutants in storm water discharges. The SWPPP must clearly describe for each major activity identified in Part IV.D.1.b:
- a) appropriate control measures and the general timing (or sequence) during the construction process that the measures will be implemented; and
  - b) which permittee is responsible for implementation (e.g., perimeter controls for one portion of the site will be installed by Contractor A after the clearing and grubbing necessary for installation of the measure, but before the clearing and grubbing for the remaining portions of the site; and perimeter controls will be actively maintained by Contractor B until final stabilization of those portions of the site up-gradient of the perimeter control; and temporary perimeter controls will be removed by the owner after final stabilization). The description and implementation of control measures shall address the following minimum components:

**a. Erosion and Sediment Controls.**

**(1) *Short and Long Term Goals and Criteria:***

- (a) The construction-phase erosion and sediment controls should be designed to retain sediment on site to the extent practicable.

**(1) *Short and Long Term Goals and Criteria:* (Continued)**

- (b)** All control measures must be properly selected, installed, and maintained in accordance with the manufacturers specifications and good engineering practices. If periodic inspections or other information indicates a control has been used inappropriately, or incorrectly, the permittee must replace or modify the control for site situations.
- (c)** If sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize offsite impacts (e.g., fugitive sediment in street could be washed into storm sewers by the next rain and/or pose a safety hazard to users of public streets).
- (d)** Sediment must be removed from sediment traps or sedimentation ponds when design capacity has been reduced by 50%.
- (e)** Litter, construction debris, and construction chemicals exposed to storm water shall be prevented from becoming a pollutant source for storm water discharges (e.g., screening outfalls, picked up daily).
- (f)** Offsite material storage areas (also including overburden and stockpiles of dirt, borrow areas, etc.) used solely by the permitted project are considered a part of the project and shall be addressed in the SWPPP.

**(2) *Stabilization Practices:*** The SWPPP must include a description of interim and permanent stabilization practices for the site, including a schedule of when the practices will be implemented. Site plans should ensure that existing vegetation is preserved where attainable and that disturbed portions of the site are stabilized. Stabilization practices may include but are not limited to: establishment of temporary vegetation, establishment of permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Use of impervious surfaces for stabilization should be avoided.

The following records shall be maintained and attached to the SWPPP: the dates when major grading activities occur; the dates when construction activities temporarily or permanently cease on a portion of the site; and the dates when stabilization measures are initiated.

Except as provided in Parts IV.D.2.a.(2)(a), (b), and (c) below, stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased.

- (a)** Where the initiation of stabilization measures by the 14th day after construction activity temporary or permanently cease is precluded by snow cover or frozen ground conditions, stabilization measures shall be initiated as soon as practicable.
- (b)** Where construction activity on a portion of the site is temporarily ceased, and earth disturbing activities will be resumed within 21 days, temporary stabilization measures do not have to be initiated on that portion of site.

(2) *Stabilization Practices:* (Continued)

- (c) In arid areas (areas with an average annual rainfall of 0 to 10 inches), semi-arid areas (areas with an average annual rainfall of 10 to 20 inches), and areas experiencing droughts where the initiation of stabilization measures by the 14th day after construction activity has temporarily or permanently ceased is precluded by seasonal arid conditions, stabilization measures shall be initiated as soon as practicable.

(3) *Structural Practices:* The SWPPP must include a description of structural practices to divert flows from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable. Structural practices may include but are not limited to: silt fences, earth dikes, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins. Placement of structural practices in floodplains should be avoided to the degree attainable. The installation of these devices may be subject to section 404 of the CWA.

- (a) For common drainage locations that serve an area with ten (10) or more acres disturbed at one time, a temporary (or permanent) sediment basin that provides storage for a calculated volume of runoff from a 2 year, 24 hour storm from each disturbed acre drained, or equivalent control measures, shall be provided where attainable until final stabilization of the site. Where no such calculation has been performed, a temporary (or permanent) sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent control measures, shall be provided where attainable until final stabilization of the site. When computing the number of acres draining into a common location it is not necessary to include flows from offsite areas and flows from onsite areas that are either undisturbed or have undergone final stabilization where such flows are diverted around both the disturbed area and the sediment basin.

In determining whether installing a sediment basin is attainable, the permittee may consider factors such as site soils, slope, available area on site, etc. In any event, the permittee must consider public safety, especially as it relates to children, as a design factor for the sediment basin and alternative sediment controls shall be used where site limitations would preclude a safe design. For drainage locations which serve ten (10) or more disturbed acres at one time and where a temporary sediment basin or equivalent controls is not attainable, smaller sediment basins and/or sediment traps should be used. Where neither the sediment basin nor equivalent controls are attainable due to site limitations, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope boundaries of the construction area and for those side slope boundaries deemed appropriate as dictated by individual site conditions. EPA encourages the use of a combination of sediment and erosion control measures in order to achieve maximum pollutant removal.

- (b) For drainage locations serving less than 10 acres, smaller sediment basins and/or sediment traps should be used. At a minimum, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope boundaries (and for those side slope boundaries deemed appropriate as dictated by individual site conditions) of the construction area unless a sediment basin providing storage for a calculated volume

**(3) *Structural Practices:* (Continued)**

of runoff from a 2 year, 24 hour storm or 3,600 cubic feet of storage per acre drained is provided. EPA encourages the use of a combination of sediment and erosion control measures in order to achieve maximum pollutant removal.

- b. Storm Water Management. A description of measures that will be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed must be included in the SWPPP. Structural measures should be placed on upland soils to the degree attainable. The installation of these devices may also require a separate permit under section 404 of the CWA. Permittees are only responsible for the installation and maintenance of storm water management measures prior to final stabilization of the site, and are not responsible for maintenance after storm water discharges associated with construction activity have been eliminated from the site. However, post-construction storm water BMPs that discharge pollutants from point sources once construction is completed, may in themselves, need authorization under a separate NPDES permit.

- (1) Such practices may include but are not limited to: storm water detention structures (including wet ponds); storm water retention structures; flow attenuation by use of open vegetated swales and natural depressions; infiltration of runoff onsite; and sequential systems (which combine several practices). The SWPPP shall include an explanation of the technical basis used to select the practices to control pollution where flows exceed predevelopment levels.
- (2) Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel to provide a non-erosive flow velocity from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g. no significant changes in the hydrological regime of the receiving water).

c. Other Controls.

- (1) No solid materials, including building materials, shall be discharged to waters of the United States, except as authorized by a permit issued under section 404 of the CWA.
- (2) Off-site vehicle tracking of sediments and the generation of dust shall be minimized.
- (3) The SWPPP shall be consistent with applicable State, Tribal and/or local waste disposal, sanitary sewer or septic system regulations to the extent these are located within the permitted area.
- (4) The SWPPP shall include a description of construction and waste materials expected to be stored on-site with updates as appropriate. The SWPPP shall also include a description of controls to reduce pollutants from these materials including storage practices to minimize exposure of the materials to storm water, and spill prevention and response.
- (5) The SWPPP shall include a description of pollutant sources from areas other than construction (including storm water discharges from dedicated asphalt plants and dedicated concrete plants), and a description of controls and measures that will be implemented at those sites to minimize pollutant discharges.

c. Other Controls. (Continued)

- (6) The SWPPP shall include a description of measures necessary to protect listed endangered or threatened species, or critical habitat, including any terms or conditions that are imposed under the eligibility requirements of Part I.B.3.e (4) of this permit. Failure to describe and implement such measures will result in storm water discharges from construction activities that are ineligible for coverage under this permit.

d. Approved State, Tribal or Local Plans.

- (1) Permittees which discharge storm water associated with construction activities must ensure their storm water pollution prevention plan is consistent with requirements specified in applicable sediment and erosion site plans or site permits, or storm water management site plans or site permits approved by State, Tribal, or local officials.
- (2) Storm water pollution prevention plans must be updated as necessary to remain consistent with any changes applicable to protecting surface water resources in sediment and erosion site plans or site permits, or storm water management site plans or site permits approved by State, Tribal or local officials for which the permittee receives written notice..
3. **Maintenance.** All erosion and sediment control measures and other protective measures identified in the SWPPP must be maintained in effective operating condition. If site inspections required by Part IV.D.4. identify BMPs that are not operating effectively, maintenance shall be performed before the next anticipated storm event, or as necessary to maintain the continued effectiveness of storm water controls. If maintenance prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable.
4. **Inspections.** Qualified personnel (provided by the permittee or cooperatively by multiple permittees) shall inspect disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, structural control measures, and locations where vehicles enter or exit the site, at least once every fourteen (14) calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater.

Where sites have been finally or temporarily stabilized, runoff is unlikely due to winter conditions (e.g., site is covered with snow, ice, or frozen ground exists), or during seasonal arid periods in arid areas (areas with an average annual rainfall of 0 to 10 inches) and semi-arid areas (areas with an average annual rainfall of 10 to 20 inches) such inspections shall be conducted at least once every month.

Permittees are eligible for a waiver of monthly inspection requirements until one month **before** thawing conditions are expected to result in a discharge if all of the following requirements are met: 1) the project is located in an area where frozen conditions are anticipated to continue for extended periods of time (i.e., more than one month); 2) land disturbance activities have been suspended; and 3) the beginning and ending dates of the waiver period are documented in the SWPPP.

- a. Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Sediment and erosion control measures identified in the SWPPP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to



**4. Inspections. (Continued)**

receiving waters. Where discharge locations are inaccessible, nearby downstream locations shall be inspected to the extent that such inspections are practicable. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.

- b. Based on the results of the inspection, the SWPPP shall be modified as necessary (e.g., show additional controls on map required by Part IV.D.1; revise description of controls required by Part IV.D.2) to include additional or modified BMPs designed to correct problems identified. Revisions to the SWPPP shall be completed within 7 calendar days following the inspection. If existing BMPs need to be modified or if additional BMPs are necessary, implementation shall be completed before the next anticipated storm event. If implementation before the next anticipated storm event is impracticable, they shall be implemented as soon as practicable.
- c. A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, and major observations relating to the implementation of the SWPPP shall be made and retained as part of the SWPPP for at least three years from the date that the site is finally stabilized. Major observations should include: the location(s) of discharges of sediment or other pollutants from the site; location(s) of BMPs that need to be maintained; location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location; and location(s) where additional BMPs are needed that did not exist at the time of inspection. Actions taken in accordance with Part IV.D.4.b of this permit shall be made and retained as part of the storm water pollution prevention plan for at least three years from the date that the site is finally stabilized. Such reports shall identify any incidents of non-compliance. Where a report does not identify any incidents of non-compliance, the report shall contain a certification that the facility is in compliance with the storm water pollution prevention plan and this permit. The report shall be signed in accordance with Part VI.G of this permit.

- 5. Non-Storm Water Discharges.** Except for flows from fire fighting activities, sources of non-storm water listed in Part III.A.2 or 3 of this permit that are combined with storm water discharges associated with construction activity must be identified in the SWPPP. The SWPPP shall identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

***Part V. RETENTION OF RECORDS***

- A. **Documents.** The permittee shall retain copies of storm water pollution prevention plans and all reports required by this permit, and records of all data used to complete the Notice of Intent to be covered by this permit, for a period of at least three years from the date that the site is finally stabilized. This period may be extended by request of the Director at any time.
- B. **Accessibility.** The permittee shall retain a copy of the storm water pollution prevention plan required by this permit (including a copy of the permit language) at the construction site (or other local location accessible to the Director, a State, Tribal or local agency approving sediment and erosion plans, grading plans, or storm water management plans; local government officials; or the operator of a municipal separate storm sewer receiving discharges from the site) from the date of project initiation to the date of final stabilization. Permittees with day-to-day operational control over SWPPP implementation shall have a copy of the SWPPP available at a central location on-site for the use of all operators and those identified as having responsibilities under the SWPPP whenever they are on the construction site.
- C. **Addresses.** Except for the submittal of NOIs and NOTs (see Parts II.C and VIII.B, respectively), all written correspondence concerning discharges in any State, Indian Country land or from any Federal facility covered under this permit and directed to the EPA, including the submittal of individual permit applications, shall be sent to the following address:

United States EPA, Region 8  
Ecosystems Protection Program (8EPR-EP)  
Storm Water Staff  
999 18th Street, Suite 500  
Denver, CO 80202-2466

***Part VI. STANDARD PERMIT CONDITIONS*****A. Duty to Comply.**

1. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of CWA and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.
2. **Penalties for Violations of Permit Conditions.** The Director will adjust the civil and administrative penalties listed below in accordance with the Civil Monetary Penalty Inflation Adjustment Rule (Federal Register: December 31, 1996, Volume 61, Number 252, pages 69359-69366, as corrected, March 20, 1997, Volume 62, Number 54, pages 13514-13517) as mandated by the Debt Collection Improvement Act of 1996 for inflation on a periodic basis. This rule allows EPA's penalties to keep pace with inflation. The Agency is required to review its penalties at least once every four years thereafter and to adjust them as necessary for inflation according to a specified formula. The civil and administrative penalties listed below were adjusted for inflation starting in 1996.

**a. Criminal.**

- (1) *Negligent Violations.* The CWA provides that any person who negligently violates permit conditions implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than \$2,500 nor more than \$25,000 per day of violation, or by imprisonment for not more than 1 year, or both.
- (2) *Knowing Violations.* The CWA provides that any person who knowingly violates permit conditions implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than \$5,000 nor more than \$50,000 per day of violation, or by imprisonment for not more than 3 years, or both.
- (3) *Knowing Endangerment.* The CWA provides that any person who knowingly violates permit conditions implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act and who knows at that time that he is placing another person in imminent danger of death or serious bodily injury is subject to a fine of not more than \$250,000, or by imprisonment for not more than 15 years, or both.
- (4) *False Statement.* The CWA provides that any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under the Act or who knowingly falsifies, tampers with, or renders inaccurate, any monitoring device or method required to be maintained under the Act, shall upon conviction, be punished by a fine of not more than \$10,000 or by imprisonment for not more than two years, or by both. If a conviction is for a violation committed after a first conviction of such person under this paragraph, punishment shall be by a fine of not more than \$20,000 per day of violation, or by imprisonment of not more than four years, or by both. (See section 309.c.4 of the Clean Water Act).

- b. **Civil Penalties.** The CWA provides that any person who violates a permit condition implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a civil penalty not to exceed \$27,500 per day for each violation.

**2. Penalties for Violations of Permit Conditions. (Continued)**

- c. **Administrative Penalties.** The CWA provides that any person who violates a permit condition implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to an administrative penalty, as follows:
- (1) *Class I Penalty.* Not to exceed \$11,000 per violation nor shall the maximum amount exceed \$27,500.
  - (2) *Class II Penalty.* Not to exceed \$11,000 per day for each day during which the violation continues nor shall the maximum amount exceed \$137,500.
- B. **Continuation of the Expired General Permit.** If this permit is not reissued or replaced prior to the expiration date, it will be administratively continued in accordance with the Administrative Procedures Act and remain in force and effect. Any permittee who was granted permit coverage prior to the expiration date will automatically remain covered by the continued permit until the earlier of:
1. Reissuance or replacement of this permit, at which time the permittee must comply with the Notice of Intent conditions of the new permit to maintain authorization to discharge; or
  2. the permittee's submittal of a Notice of Termination; or
  3. issuance of an individual permit for the permittee's discharges; or
  4. a formal permit decision by the Director not to reissue this general permit, at which time the permittee must seek coverage under an alternative general permit or an individual permit.
- C. **Need to Halt or Reduce Activity not a Defense.** It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.
- D. **Duty to Mitigate.** The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.
- E. **Duty to Provide Information.** The permittee shall furnish to the Director or an authorized representative of the Director any information which is requested to determine compliance with this permit or other information.
- F. **Other Information.** When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the Notice of Intent or in any other report to the Director, he or she shall promptly submit such facts or information.
- G. **Signatory Requirements.** All Notices of Intent, Notices of Termination, storm water pollution prevention plans, reports, certifications or information either submitted to the Director or the operator of a large or medium municipal separate storm sewer system, or that this permit requires be maintained by the permittee, shall be signed as follows:
1. All Notices of Intent and Notices of Termination shall be signed as follows:

**G. Signatory Requirements.** (Continued)

- a. for a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or the manager of one or more manufacturing, production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25,000,000 (in second-quarter 1980 dollars) if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;
  - b. for a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or
  - c. for a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes (1) the chief executive officer of the agency, or (2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).
2. All reports required by this permit and other information requested by the Director or authorized representative of the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
- a. the authorization is made in writing by a person described above and submitted to the Director.
  - b. the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator, superintendent, or position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position).
  - c. Changes to Authorization. If an authorization under Part II.B is no longer accurate because a different operator has responsibility for the overall operation of the construction site, a new Notice of Intent satisfying the requirements of Part II.B must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative. The change in authorization must be submitted within the time frame specified in Part II.A.3, and sent to the address specified in Part II.C.
  - d. Certification. Any person signing documents under Part VI.G shall make the following certification:

*"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."*

- H. **Penalties for Falsification of Reports.** Section 309(c)(4) of the Clean Water Act provides that any person who knowingly makes any false material statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than \$10,000, or by imprisonment for not more than two years, or by both.
- I. **Oil and Hazardous Substance Liability.** Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under section 311 of the CWA or section 106 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA).
- J. **Property Rights.** The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.
- K. **Severability.** The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.
- L. **Requiring an Individual Permit or an Alternative General Permit.**
1. The Director may require any person authorized by this permit to apply for and/or obtain either an individual NPDES permit or an alternative NPDES general permit. Any interested person may petition the Director to take action under this paragraph. Where the Director requires a permittee authorized to discharge under this permit to apply for an individual NPDES permit, the Director shall notify the permittee in writing that a permit application is required. This notification shall include a brief statement of the reasons for this decision, an application form, a statement setting a deadline for the permittee to file the application, and a statement that on the effective date of issuance or denial of the individual NPDES permit or the alternative general permit as it applies to the individual permittee, coverage under this general permit shall automatically terminate. Applications shall be submitted to the appropriate Regional Office indicated in Part V.C of this permit. The Director may grant additional time to submit the application upon request of the applicant. If a permittee fails to submit in a timely manner an individual NPDES permit application as required by the Director under this paragraph, then the applicability of this permit to the individual NPDES permittee is automatically terminated at the end of the day specified by the Director for application submittal.
  2. Any permittee authorized by this permit may request to be excluded from the coverage of this permit by applying for an individual permit. In such cases, the permittee shall submit an individual application in accordance with the requirements of 40 CFR 122.26(c)(1)(ii), with reasons supporting the request, to the Director at the address for the appropriate Regional Office indicated in Part V.C of this permit. The request may be granted by issuance of any individual permit or an alternative general permit if the reasons cited by the permittee are adequate to support the request.
  3. When an individual NPDES permit is issued to a permittee otherwise subject to this permit, or the permittee is authorized to discharge under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee is automatically terminated on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit, whichever the case may be. When an individual NPDES permit is denied to an owner or operator otherwise subject to this permit, or the owner or operator is denied for coverage under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee is automatically terminated on the date of such denial, unless otherwise specified by the Director.

**M. State/Tribal Environmental Laws.**

1. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State/Tribal law or regulation under authority preserved by section 510 of the Act.
2. No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations.

**N. Proper Operation and Maintenance.** The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of storm water pollution prevention plans. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a permittee only when necessary to achieve compliance with the conditions of this permit.

**O. Inspection and Entry.** The permittee shall allow the Director or an authorized representative of EPA, the State/Tribe, or, in the case of a construction site which discharges through a municipal separate storm sewer, an authorized representative of the municipal owner/operator or the separate storm sewer receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;
2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and
3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment).

**P. Permit Actions.** This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

***Part VII. REOPENER CLAUSE***

- A. If there is evidence indicating that the storm water discharges authorized by this permit cause, have the reasonable potential to cause or contribute to, a violation of a water quality standard, the permittee may be required to obtain an individual permit or an alternative general permit in accordance with Part I.C of this permit, or the permit may be modified to include different limitations and/or requirements.
- B. Permit modification or revocation will be conducted according to 40 CFR 122.62, 122.63, 122.64 and 124.5.
- C. EPA may propose a modification to this permit after further discussions between the Agency and the Advisory Council on Historic Preservation for the protection of historic properties.

**Part VIII. TERMINATION OF COVERAGE**

**A. Notice of Termination.** Permittees must submit a completed Notice of Termination (NOT) that is signed in accordance with Part VI.G of this permit when one or more of the conditions contained in Part I.D.2. (Terminating Coverage) have been met at a construction project. The NOT form found in Addendum D will be used unless it has been replaced by a revised version by the Director. The Notice of Termination shall include the following information:

1. The NPDES permit number for the storm water discharge identified by the Notice of Termination;
2. An indication of whether the storm water discharges associated with construction activity have been eliminated (i.e., regulated discharges of storm water are being terminated) or the permittee is no longer an operator at the site;
3. The name, address and telephone number of the permittee submitting the Notice of Termination;
4. The name of the project and street address (or a description of location if no street address is available) of the construction site for which the notification is submitted;
5. The latitude and longitude of the construction site; and
6. The following certification, signed in accordance with Part VI.G (signatory requirements) of this permit. For construction projects with more than one permittee and/or operator, the permittee need only make this certification for those portions of the construction site where the permittee was authorized under this permit and not for areas where the permittee was not an operator:

*"I certify under penalty of law that all storm water discharges associated with industrial activity from the identified facility that authorized by a general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting this notice of termination, I am no longer authorized to discharge storm water associated with industrial activity under this general permit, and that discharging pollutants in storm water associated with industrial activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the Clean Water Act."*

For the purposes of this certification, elimination of storm water discharges associated with construction activity means that all disturbed soils at the portion of the construction site where the operator had control have been finally stabilized (as defined in Part IX.I) and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time to ensure final stabilization is maintained, or that all storm water discharges associated with construction activities from the identified site that are authorized by a NPDES general permit have otherwise been eliminated from the portion of the construction site where the operator had control.

**B. Addresses.**

1. All Notices of Termination, signed in accordance with Part VI.G of this permit, are to be submitted using the form provided by the Director (or a photocopy thereof), to the address specified on the NOT form.



**Part IX. DEFINITIONS**

- A. **"Best Management Practices" ("BMPs")** means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.
- B. **"Control Measure"** as used in this permit, refers to any Best Management Practice or other method used to prevent or reduce the discharge of pollutants to waters of the United States.
- C. **"Commencement of Construction"** the initial disturbance of soils associated with clearing, grading, or excavating activities or other construction activities.
- D. **"CWA"** means the Clean Water Act or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq.
- E. **"Director"** means the Regional Administrator of the Environmental Protection Agency or an authorized representative.
- F. **"Discharge"** when used without qualification means the "discharge of a pollutant."
- G. **"Discharge of Storm Water Associated with Construction Activity"** as used in this permit, refers to a discharge of pollutants in storm water runoff from areas where soil disturbing activities (e.g., clearing, grading, or excavation), construction materials or equipment storage or maintenance (e.g., fill piles, borrow areas, concrete truck washout, fueling), or other industrial storm water directly related to the construction process (e.g., concrete or asphalt batch plants) are located.
- H. **"Facility or Activity"** means any NPDES "point source" or any other facility or activity (including land and appurtenances thereto) that is subject to regulation under the NPDES program.
- I. **"Final Stabilization"** means that either:
1. All soil disturbing activities at the site have been completed and a uniform (e.g., evenly distributed, without large bare areas) perennial vegetative cover with a density of 70% of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed. In some parts of the country, background native vegetation will cover less than 100% of the ground (e.g., arid areas, beaches). Establishing at least 70% of the natural cover of native vegetation meets the vegetative cover criteria for final stabilization (e.g., if the native vegetation covers 50% of the ground, 70% of 50% would require 35% total cover for final stabilization; on a beach with no natural vegetation, no stabilization is required); or
  2. For individual lots in residential construction by either: a) the homebuilder completing final stabilization as specified above, or b) the homebuilder establishing temporary stabilization including perimeter controls for an individual lot prior to occupation of the home by the homeowner and informing the homeowner of the need for, and benefits of, final stabilization. (Homeowners typically have an incentive to put in landscaping functionally equivalent to final stabilization as quick as possible to keep mud out of their homes and off their sidewalks and driveways.); or

**I. "Final Stabilization" (continued)**

3. For construction projects on land used for agricultural purposes (e.g., pipelines across crop or range land), final stabilization may be accomplished by returning the disturbed land to its preconstruction agricultural use. Areas disturbed that were not previously used for agricultural activities, such as buffer strips immediately adjacent to "waters of the United States," and areas which are not being returned to their preconstruction agricultural use must meet the final stabilization criteria in (1) or (2) above.

**J. "Flow-Weighted Composite Sample"** means a composite sample consisting of a mixture of aliquots collected at a constant time interval, where the volume of each aliquot is proportional to the flow rate of the discharge.

**K. "Large and Medium Municipal Separate Storm Sewer System"** - means all municipal separate storm sewers that are either:

1. Located in an incorporated place (city) with a population of 100,000 or more as determined by the latest Decennial Census by the Bureau of Census (these cities are listed in Appendices F and G of 40 CFR 122); or
2. Located in the counties with unincorporated urbanized populations of 100,000 or more, except municipal separate storm sewers that are located in the incorporated places, townships or towns within such counties (these counties are listed in Appendices H and I of 40 CFR 122); or
3. Owned or operated by a municipality other than those described in paragraph (i) or (ii) and that are designated by the Director as part of the large or medium municipal separate storm sewer system.

**L. "NOI"** means Notice of Intent to be covered by this permit (see Part II of this permit.)

**M. "NOT"** means Notice of Termination (see Part VIII of this permit).

**N. "Operator"** for the purpose of this permit and in the context of storm water associated with construction activity, means any party associated with a construction project that meets either of the following two criteria:

1. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
2. The party has day-to-day operational control of those activities at a project which are necessary to ensure compliance with a storm water pollution prevention plan for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions).

This definition is provided to inform permittees of EPA's interpretation of how the regulatory definitions of "owner or operator" and "facility or activity" are applied to discharges of storm water associated with construction activity.

**O "Owner or Operator"** means the owner or operator of any "facility or activity" subject to regulation under the NPDES program.

- P. **"Point Source"** means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.
- Q. **"Pollutant"** is defined at 40 CFR 122.2. A partial listing from this definition includes: dredged spoil, solid waste, sewage, garbage, sewage sludge, chemical wastes, biological materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial or municipal waste.
- R. **"Runoff Coefficient"** means the fraction of total rainfall that will appear at the conveyance as runoff.
- S. **"Storm Water"** means storm water runoff, snow melt runoff, and surface runoff and drainage.
- T. **"Storm Water Associated with Industrial Activity"** is defined at 40 CFR 122.26(b)(14) and incorporated here by reference. Most relevant to this permit is 40 CFR 122.26(b)(14)(x), which relates to construction activity including clearing, grading and excavation activities that result in the disturbance of five (5) or more acres of total land area, or are part of a larger common plan of development or sale.
- U. **"Waters of the United States"** means:
1. All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
  2. All interstate waters, including interstate "wetlands";
  3. All other waters such as interstate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:
    - a. Which are or could be used by interstate or foreign travelers for recreational or other purposes;
    - b. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    - c. Which are used or could be used for industrial purposes by industries in interstate commerce;
  4. All impoundments of waters otherwise defined as waters of the United States under this definition;
  5. Tributaries of waters identified in paragraphs (a) through (d) of this definition;
  6. The territorial sea; and
  7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs 1. through 6. of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA (other than cooling ponds for steam electric generation stations per 40 CFR 423) which also meet the criteria of this definition) are not waters of the United States. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA.

## ADDENDUM A - ENDANGERED SPECIES

### I. Instructions for Applicants

#### A. Background

To meet its obligations under the Clean Water Act and the Endangered Species Act (ESA) and to promote those Acts' goals, the Environmental Protection Agency (EPA) is seeking to ensure the activities regulated by the Construction General Permit (CGP) are protective of endangered and threatened species and critical habitat. To ensure that those goals are met, applicants for CGP coverage are required under Part I.B.3.e. to assess the impacts of their storm water discharges and storm water discharge-related activities on Federally listed endangered and threatened species ("listed species") and designated critical habitat ("critical habitat") by following Steps One through Six listed below. EPA strongly recommends that applicants follow these steps at the earliest possible stage to ensure that measures to protect listed species and critical habitat are incorporated early in the planning process. At minimum, the procedures should be followed when developing the storm water pollution prevention plan.

Permittees and applicants also have an independent ESA obligation to ensure that their activities do not result in any prohibited "takes" of listed species.<sup>1</sup> Many of the measures required in the CGP and in these instructions to protect species may also assist permittees in ensuring that their construction activities do not result in a prohibited take of species in violation of § 9 of the ESA. Applicants who plan construction activities in areas that harbor endangered and threatened species are advised to ensure that they are protected from potential takings liability under ESA § 9 by obtaining either an ESA § 10 permit or by requesting formal consultation under ESA § 7 (as described in more detail in Step Seven below). Applicants who seek protection from takings liability should be aware that it is possible that some specific construction activities may be too unrelated to storm water discharges to be afforded incidental take coverage through an ESA § 7 consultation that is performed to meet the eligibility requirements for CGP coverage. In such instances, applicants should apply for an ESA § 10 permit. Where applicants are not sure whether to pursue a § 10 permit or a § 7 consultation for takings protection, they should confer with the appropriate Fish and Wildlife Service (FWS) or National Marine Fisheries Service (NMFS) office.

This permit provides for the possibility of multiple permittees at a construction site. Applicants should be aware that in many cases they can meet the permit eligibility requirements by relying on another operator's certification of eligibility under Part I.B.3.e.(2)(a), (b), or (c). This is allowed under Part I.B.3.e.(2)(d) of the permit. However, the other operator's certification must apply to the applicant's project area and must address the effects from the applicant's storm water discharges and storm water discharge-related activities on listed species and critical habitat. By certifying eligibility under Part I.B.3.e.(2)(d), the applicant agrees to comply with any measures or controls upon which the other operator's certification under Part I.B.3.e.(2)(a), (b) or (c) was based. This situation will typically occur where a developer or primary contractor, such as one for construction of a subdivision or industrial park, conducts a comprehensive assessment of effects on listed species and critical habitat for the entire construction project, certifies eligibility under Part I.B.3.e.(2)(a), (b) or (c), and that certification is relied upon by other operators (i.e., contractors) at the site. However, applicants

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<sup>1</sup> Section 9 of the ESA prohibits any person from "taking" a listed species (e.g., harassing or harming it) unless: 1) the taking is authorized through a "incidental take statement" as part of undergoing ESA § 7 formal consultation; 2) where an incidental take permit is obtained under ESA § 10 (which requires the development of a habitat conservation plan); or 3) where otherwise authorized or exempted under the ESA. This prohibition applies to all entities including private individuals, businesses, and governments.

**A. Background (Continued)**

that consider relying on another operator's certification should carefully review that certification along with any supporting information. If an applicant does not believe that the operator's certification provides adequate coverage for the applicant's storm water discharges and storm water discharge-related activities or for the applicant's particular project area, the applicant should provide its own independent certification under Part I.B.3.e.(2)(a), (b), or (c).

**B. Procedures**

To receive coverage under the Construction General Permit, applicants must assess the potential effects of their storm water discharges and storm water discharge-related activities on listed species and their critical habitat. To make this assessment, applicants must follow the steps outlined below prior to completing and submitting Notice of Intent (NOI) form. Applicants who are able to certify eligibility under Parts I.B.3.e.(2)(b), (c) or (d) because of a previously issued ESA § 10 permit, a previously completed ESA § 7 consultation, or because the applicant's activities were already addressed in another operator's certification of eligibility may proceed directly to Step Six.

**Note** - EPA's new NOI form which is included in Addendum C of this permit (published in the Federal Register on March 6, 1998, 63 FR 11253), requires that applicants provide detailed certification information on listed species. Previous versions of NOI forms should not be used any longer because they do not contain the specific certification provisions relating to listed species and critical habitats at construction projects. Use of the older NOI forms do not relieve applicants of their obligation to follow the procedures listed below to determine if their construction storm water discharges or storm water discharge-related activities meet permit eligibility requirements for the protection of listed species and critical habitat. By following these instructions, applicants will have sufficient information on listed species and critical habitat in order to complete the new NOI form (see Addendum C, page 45) and sign the certification statement.

**Step One: Determine if the Construction Site Is Found Within Designated Critical Habitat for Listed Species**

Some, but not all, listed species have designated critical habitat. Exact locations of such habitat is provided in the Service regulations at 50 CFR Parts 17 and 226. To determine if their construction site occurs within designated critical habitat, applicants should either:

- Contact the nearest Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) Office. A list of FWS and NMFS offices is found in Section II of this Addendum; or
- Contact the State or Tribal Natural Heritage Centers. These centers compile and disseminate information on Federally listed and other protected species. They frequently have the most current information on listed species and critical habitat. A list of these centers is provided in Section III of this Addendum; or

**Step One: (Continued)**

- Review those regulations (which can be found in many larger libraries).

If the construction site is not located in designated critical habitat, then the applicant does not need to consider impacts to critical habitat when following Steps Two through Six below. If the site is located within critical habitat, then the applicant must look at impacts to critical habitat when following Steps Two through Six. Note that many but not all measures imposed to protect listed species under these steps will also protect critical habitat. Thus, meeting the eligibility requirements of this permit may require measures to protect critical habitat that are separate from those to protect listed species.

**Step Two: Determine if Listed Species are Located in the County(ies) Where the Construction Activity Will Occur.**

Section IV of the Addendum contains a county-by-county list of listed endangered and threatened species ("listed species"), and proposed endangered and threatened species ("proposed species"). Since the list was current as of September 1, 1997, applicants must also check with other sources for updated species and county information. These sources include: Sections II and III of this Addendum; EPA's Office of Wastewater Management's web page at "<http://www.epa.gov/owm>" where updates of the county-by-county list will be posted on a periodic basis; Federal Register Notices; State wildlife protection offices; a biologist or similar professional in the environmental field; or any other method which can be reasonably expected to provide this information. Applicants with construction projects located in EPA Region 2 and Region 6 can call the Storm Water General Permits Hotline at (800) 245-6510 for further assistance, while applicants with projects located in EPA Regions 1, 3, 7, 8, 9 and 10 may contact the appropriate EPA Regional Office.

Where a facility is located in more than one county, the lists for all counties should be reviewed. Where a facility discharges into a water body which serves as a border between counties or which crosses a county line which is in the immediate vicinity of the point of discharge, applicants should also review the species list for the county which lies immediately downstream or is across the water body from the point of discharge.

After a review of the available information from the sources mentioned above, if no listed species are located in a facility's county, and the construction site is not located in critical habitat as described under Step One, an applicant is eligible for CGP coverage without further inquiry into the presence of, or effect to, listed species. The applicant must check the appropriate certification item on the NOI form (Part I.B.3.e.(2)(a)).

Once the applicant has determined which listed species are located in his or her facility's county, the applicant must follow Step Three.

**Step Three: Determine if any Federally Listed Endangered and Threatened Species May Be Present in the Project Area**

The project area consists of:

**Step Three: (Continued)**

- The areas on the construction site where storm water discharges originate and flow toward the point of discharge into the receiving waters (including areas where excavation, site development, or other ground disturbance activities occur) and the immediate vicinity.

**Example(s)**

1. Where bald eagles nest in a tree that is on or bordering a construction site and could be disturbed by the construction activity.
  2. Where grading causes storm water to flow into a small wetland or other habitat that is on the site which contains listed species.
- The areas where storm water discharges flow from the construction site to the point of discharge into receiving waters.

**Example(s)**

1. Where storm water flows into a ditch, swale, or gully which leads to receiving waters and where listed species (such as amphibians) are found in the ditch, swale, or gully.
- The areas where storm water from construction activities discharge into receiving waters and the areas in the immediate vicinity of the point of discharge.

**Example(s)**

1. Where storm water from construction activities discharges into a stream segment that is known to harbor listed aquatic species.
- The areas where storm water BMPs will be constructed and operated, including any areas where storm water flows to and from BMPs.

**Example(s)**

1. Where a storm water retention pond would be built.

The project area will vary with the size and structure of the construction activity, the nature and quantity of the storm water discharges, the storm water discharge-related activities and the type of receiving water. Given the number of construction activities potentially covered by the CGP, no specific method to determine whether listed species may be located in the project area is required for coverage under the CGP. Instead, applicants should use the method which allows them to determine, to the best of their knowledge, whether listed species are located in their project area. These methods may include:

- Conducting visual inspections: This method may be particularly suitable for construction sites that are smaller in size or located in non-natural settings such as highly urbanized areas or industrial parks where there is little or no natural habitat, or for construction activities that discharge directly into municipal storm water collection systems.

**Step Three: (Continued)**

- Contacting the nearest State or Tribal wildlife agency, the Fish and Wildlife Service (FWS), or the National Marine Fisheries Service (NMFS). Many endangered and threatened species are found in well-defined areas or habitats. Such information is frequently known to State, Tribal, or Federal wildlife agencies. A list of FWS and NMFS offices is provided in Section II of this Addendum below.
- Contacting local/regional conservation groups or the State or Tribal Natural Heritage Centers (see Section III of this Addendum). State and local conservation groups may have location specific listed species information. The Natural Heritage Centers inventory species and their locations and maintain lists of sightings and habitats.
- Submitting a data request to a Natural Heritage Center. Many of these centers will provide site specific information on the presence of listed species in a project area. Some of these centers will charge a fee for researching data requests.
- Conducting a formal biological survey. Larger construction sites with extensive storm water discharges may choose to conduct biological surveys as the most effective way to assess whether species are located in the project area and whether there are likely adverse effects. Biological surveys are frequently performed by environmental consulting firms. A biological survey can be used to follow Steps Four through Six of these instructions.
- Conducting an environmental assessment under the National Environmental Policy Act (NEPA). Some construction activities may require environmental assessments under NEPA. Such assessments may indicate if listed species are in the project area. Coverage under the CGP does not trigger such an assessment because the permit does not regulate any dischargers subject to New Source Performance Standards under Section 306 of the Clean Water Act, and is thus statutorily exempted from NEPA. See CWA § 511(c). However, some construction activities might require review under NEPA because of Federal funding or other Federal involvement in the project.

If no species are found in the project area, an applicant is eligible for CGP coverage. Applicants must provide the necessary certification on the NOI form. If listed species are found in the project area, applicants must indicate the location and nature of this presence in the storm water pollution prevention plan and follow Step Four.

**Step Four: Determine if Listed Species or Critical Habitat are likely to be Adversely Affected by the Construction Activity's Storm Water Discharges or Storm Water Discharge-related Activities.**

To receive CGP coverage, applicants must assess whether their storm water discharges or storm water discharge-related activities are likely to adversely affect listed species or critical habitat.

“Storm water discharge-related activities” include:

- activities which cause, contribute to, or result in point source storm water pollutant discharges, including but not limited to excavation, site development, grading, and other surface disturbance activities; and



**Step Four: (Continued)**

- measures to control storm water discharges including the siting, construction, operation of best management practices (BMPs) to control, reduce or prevent storm water pollution.

Potential adverse effects from storm water discharges and storm water discharge-related activities include:

- Hydrological. Storm water discharges may cause siltation, sedimentation or induce other changes in receiving waters such as temperature, salinity or pH. These effects will vary with the amount of storm water discharged and the volume and condition of the receiving water. Where a storm water discharge constitutes a minute portion of the total volume of the receiving water, adverse hydrological effects are less likely. Construction activity itself may also alter drainage patterns on a site where construction occurs which can impact listed species or critical habitat.
- Habitat. Excavation, site development, grading, and other surface disturbance activities from construction activities, including the installation or placement of storm water BMPs, may adversely affect listed species or their habitat. Storm water may drain or inundate listed species habitat.
- Toxicity. In some cases, pollutants in storm water may have toxic effects on listed species.

The scope of effects to consider will vary with each site. If the applicant is having difficulty in determining whether his or her project is likely to adversely effect a listed specie or critical habitat, then the appropriate office of the FWS, NMFS or Natural Heritage Center listed in Sections II and III of this Addendum should be contacted for assistance. If adverse effects are not likely, then the applicant should make the appropriate certification on the NOI form and apply for coverage under the permit. If adverse effects are likely, applicants must follow Step Five.

**Step Five: Determine if Measures Can Be Implemented To Avoid any Adverse Effects**

If an applicant makes a preliminary determination that adverse effects are likely, it can still receive coverage under Part I.B.3.e.(2)(a) of the CGP if appropriate measures are undertaken to avoid or eliminate the likelihood of adverse effects prior to applying for permit coverage. These measures may involve relatively simple changes to construction activities such as re-routing a storm water discharge to bypass an area where species are located, relocating BMPs, or by changing the “footprint” of the construction activity. Applicants may wish to contact the FWS and/or NMFS to see what appropriate measures might be suitable to avoid or eliminate the likelihood of adverse impacts to listed species and/or critical habitat. (See 50 CFR 402.13(b)). This can entail the initiation of informal consultation with the FWS and/or NMFS which is described in more detail in Step Six.

**Step Five: (Continued)**

If applicants adopt measures to avoid or eliminate adverse effects, they must continue to abide by those measures during the course of permit coverage. These measures must be described in the storm water pollution prevention plan and may be enforceable as permit conditions. If appropriate measures to avoid the likelihood of adverse effects are not available to the applicant, the applicant must follow Step Six.

**Step Six: Determine if the Eligibility Requirements of Part I.B.3.e.(2)(b)-(d) Can Be Met.**

Where adverse effects are likely, the applicant must contact the EPA and FWS/NMFS. Applicants may still be eligible for CGP coverage if any likely adverse effects can be addressed through meeting the criteria of Part I.B.3.e.(2)(b)-(d) of the permit. These criteria are as follows:

**1. An ESA Section 7 Consultation is Performed for the Applicant's Activity (See Part I.B.3.e.(2)(b))**

Formal or informal ESA § 7 consultation is performed with the FWS and/or NMFS which addresses the effects of the applicant's storm water discharges and storm water discharge-related activities on listed species and critical habitat. The formal consultation must result in either a "no jeopardy opinion" or a "jeopardy opinion" that identifies reasonable and prudent alternatives to avoid jeopardy which are to be implemented by the applicant. The informal consultation must result in a written concurrence by the Service(s) on a finding that the applicant's storm water discharge(s) and storm water discharge-related activities are not likely to adversely affect listed species or critical habitat (for informal consultation, see 50 CFR 402.13).

Most consultations are accomplished through informal consultation. By the terms of this permit, EPA has automatically designated applicants as non-Federal representatives for the purpose of conducting informal consultations. See Part I.B.3.e.(5) and 50 CFR 402.08 and 402.13. When conducting informal ESA § 7 consultation as a non-Federal representative, applicants must follow the procedures found in 50 CFR 402 of the ESA regulations.

Applicants must also notify EPA and the Services of their intention and agreement to conduct consultation as a non-Federal representative. Consultation may occur in the context of another Federal action at the construction site (e.g., where ESA § 7 consultation was performed for issuance of a wetlands dredge and fill permit for the project or where a NEPA review is performed for the project which incorporates a section 7 consultation). Any terms and conditions developed through consultations to protect listed species and critical habitat must be incorporated into the SWPPP. As noted above, applicants may, if they wish, initiate consultation with the Services at Step Five.

Whether ESA § 7 consultation must be performed with either the FWS, NMFS or both Services depends on the listed species which may be affected by the applicant's activity. In general, NMFS has jurisdiction over marine, estuarine, and anadromous species. Applicants should also be aware that while formal § 7 consultation provides protection from incidental takings liability, informal consultation does not.

**Step Six: (Continued)**

**2. An Incidental Taking Permit Under Section 10 of the ESA is Issued for the Applicants Activity (See Part I.B.3.e.(2)(c))**

The applicant's construction activities are authorized through the issuance of a permit under § 10 of the ESA and that authorization addresses the effects of the applicant's storm water discharge(s) and storm water discharge-related activities on listed species and critical habitat. Applicants must follow FWS and/or NMFS procedures when applying for an ESA Section 10 permit (see 50 CFR § 17.22(b)(1) (FWS) and § 222.22 (NMFS)). Application instructions for Section 10 permits for NMFS species can be obtained by 1) accessing the "Office of Protected Resources" sector of the NMFS Home Page at "<http://www.nmfs.gov>" or by contacting the National Marine Fisheries Service, Office of Protected Resources, Endangered Species Division, F/PR3, 1315 East-West Highway, Silver Spring, Maryland 20910; telephone (301) 713-1401, fax (301) 713-0376.

**3. The Applicant Is Covered Under the Eligibility Certification of Another Operator for the Project Area (See Part I.B.3.e.(2)(d))**

The applicant's storm water discharges and storm water discharge-related activities were already addressed in another operator's certification of eligibility under Part I.B.3.e.(2)(b), or (c) which also included the applicant's project area. By certifying eligibility under Part I.B.3.e.(2)(d), the applicant agrees to comply with any measures or controls upon which the other operator's certification under Part I.B.3.e.(2)(a), (b) or (c) was based. Certification under Part I.B.3.e.(2)(d) is discussed in more detail in Section I.A. of this addendum.

The applicant must comply with any terms and conditions imposed under the eligibility requirements of paragraphs I.B.3.e.(2)(a), (b), (c), (d) to ensure that its storm water discharges and storm water discharge-related activities are protective of listed species and/or critical habitat. Such terms and conditions must be incorporated in the project's SWPPP. If the eligibility requirements of Part I.B.3.e.(2)(a)-(d) cannot be met, then the applicant may not receive coverage under the CGP. Applicants should then consider applying to EPA for an individual permit.

## II. LIST OF FISH AND WILDLIFE SERVICE OFFICES

### A. U.S. FISH AND WILDLIFE SERVICE OFFICES

#### National Website For Endangered Species Information

Endangered Species Home page:  
<http://www.fws.gov/~r9endspp/endspp.html>

#### Regional, State, Field and Project Offices Applicable to This Permit.

<b>Region Six - Regional Office</b>	
Division Chief, Endangered Species U.S. Fish and Wildlife Service ARD-Ecological Services P.O. Box 25486, DFC Denver, CO 80225	
<b>State, Field, and Project Offices (Region Six)</b>	
Field Supervisor U.S. Fish and Wildlife Service Colorado Field Office 730 Simms, Suite 290 Golden, CO 80401-4798	Field Supervisor U.S. Fish and Wildlife Service Western Colorado Field Office 764 Horizon Drive South, Annex A Grand Junction, CO 81506-3946
E.S. Coordinator U.S. Fish and Wildlife Service Rocky Mountain Arsenal National Wildlife Area, Building 111 Commerce City, CO 80022-1748	Colorado River Recovery Coordinator U.S. Fish and Wildlife Service P.O. Box 25486, DFC Denver, CO 80225

## III. NATURAL HERITAGE CENTER

The Natural Heritage Network comprises 85 biodiversity data centers throughout the Western Hemisphere. These centers collect, organize, and share data relating to endangered and threatened species and habitat. The network was developed to inform land-use decisions for developers, corporations, conservationists, and government agencies and is also consulted for research and educational purposes. The centers maintain a **Natural Heritage Network Control Server Website** (<http://www.heritage.tnc.org>) which provides website and other access to a large number of specific biodiversity centers. The center located in Colorado is listed below:

#### Colorado Natural Heritage Program

Colorado State University  
254 General Services Building  
Fort Collins, CO 80523  
970/491-1309 Fax: 970/491-3349

## IV. COUNTY LIST OF ENDANGERED AND THREATENED SPECIES IN COLORADO

[The following list identifies federally listed or proposed U.S. species by State and County. It has been updated through September 1, 1997.]

Note: Species listed below with a status of both E and T are generally either endangered or threatened within the specified county. The assignment of two status designations for a species in a specific county is a function of the data set used to develop this list. For purposes of this permit, however, the obligation to assess the impact of storm water discharges on listed species does not vary based on which of the two statuses (e.g., endangered threatened) is assigned (see Addendum A Instructions). Designation of critical habitat (CH) does not mean that the county constitutes critical habitat, only that critical habitat has been designated for that species (see Addendum A Instructions).

State/County	Group name	Inverse name	Scientific name	Action/ Status
<b>COLORADO</b>				
ADAMS	BIRDS	EAGLE, BALD	<i>Haliaeetus leucocephalus</i>	L,T
ALAMOSA	BIRDS	EAGLE, BALD	<i>Haliaeetus leucocephalus</i>	L,T
		FALCON, PEREGRINE	<i>Falco peregrinus</i>	L,E
		OWL, MEXICAN SPOTTED	<i>Strix occidentalis lucida</i>	L,T,CH
ARCHULETA	MAMMALS	FERRET, BLACK-FOOTED	<i>Mustela nigripes</i>	L,E
	BIRDS	EAGLE, BALD	<i>Haliaeetus leucocephalus</i>	L,T
		FALCON, PEREGRINE	<i>Falco peregrinus</i>	L,E
		OWL, MEXICAN SPOTTED	<i>Strix occidentalis lucida</i>	L,T,CH
	MAMMALS	FERRET, BLACK-FOOTED	<i>Mustela nigripes</i>	L,E
BACA	BIRDS	EAGLE, BALD	<i>Haliaeetus leucocephalus</i>	L,T
BENT	BIRDS	EAGLE, BALD	<i>Haliaeetus leucocephalus</i>	L,T
BOULDER	FISHES	TROUT, GREENBACK CUTTHROAT	<i>Salmo clarki stomias</i>	L,T
	PLANTS	LADIES-TRESSES, UTE	<i>Spiranthes diluvialis</i>	L,T
CHAFFEE	BIRDS	EAGLE, BALD	<i>Haliaeetus leucocephalus</i>	L,T
		FALCON, PEREGRINE	<i>Falco peregrinus</i>	L,E
		OWL, MEXICAN SPOTTED	<i>Strix occidentalis lucida</i>	L,T,CH
	INSECTS	BUTTERFLY, UNCOMPAHGRE FRITILLARY	<i>Boloria acrocnema</i>	L,E
CHEYENNE	BIRDS	EAGLE, BALD	<i>Haliaeetus leucocephalus</i>	L,T
CLEAR CREEK	FISHES	TROUT, GREENBACK CUTTHROAT	<i>Salmo clarki stomias</i>	L,T
CONEJOS	BIRDS	EAGLE, BALD	<i>Haliaeetus leucocephalus</i>	L,T
		FALCON, PEREGRINE	<i>Falco peregrinus</i>	L,E
		OWL, MEXICAN SPOTTED	<i>Strix occidentalis lucida</i>	L,T,CH
	MAMMALS	FERRET, BLACK-FOOTED	<i>Mustela nigripes</i>	L,E
COSTILLA	MAMMALS	FERRET, BLACK-FOOTED	<i>Mustela nigripes</i>	L,E
CUSTER	BIRDS	FALCON, PEREGRINE	<i>Falco peregrinus</i>	L,E
		OWL, MEXICAN SPOTTED	<i>Strix occidentalis lucida</i>	L,T,CH
	FISHES	TROUT, GREENBACK CUTTHROAT	<i>Salmo clarki stomias</i>	L,T
DELTA	BIRDS	EAGLE, BALD	<i>Haliaeetus leucocephalus</i>	L,T
		FALCON, PEREGRINE	<i>Falco peregrinus</i>	L,E
	FISHES	SQUAWFISH, COLORADO	<i>Ptychocheilus lucius</i>	L,CH
		SUCKER, RAZORBACK	<i>Xyrauchen texanus</i>	L,E,CH
	MAMMALS	FERRET, BLACK-FOOTED	<i>Mustela nigripes</i>	L,E
	PLANTS	CACTUS, SPINELESS HEDGEHOG	<i>Echinocereus triglochidiatus</i> var. <i>inermis</i>	L,E
		CACTUS, UINTA BASIN HOOKLESS	<i>Sclerocactus glaucus</i> (= <i>Echinocactus</i> g., <i>S. whipplei</i> )	L,T
		WILD-BUCKWHEAT, CLAY-LOVING	<i>Erigonum pelinophilum</i>	L,E,CH
DOLORES	BIRDS	EAGLE, BALD	<i>Haliaeetus leucocephalus</i>	L,T
		OWL, MEXICAN SPOTTED	<i>Strix occidentalis lucida</i>	L,T,CH
	MAMMALS	FERRET, BLACK-FOOTED	<i>Mustela nigripes</i>	L,E
DOUGLAS	BIRDS	EAGLE, BALD	<i>Haliaeetus leucocephalus</i>	L,T
	FISHES	TROUT, GREENBACK CUTTHROAT	<i>Salmo clarki stomias</i>	L,T
	INSECTS	SKIPPER, PAWNEE MONTANE	<i>Hesperia leonardus</i> (=pawnee) <i>montana</i>	L,T
EAGLE	BIRDS	EAGLE, BALD	<i>Haliaeetus leucocephalus</i>	L,T
	INSECTS	BUTTERFLY, UNCOMPAHGRE FRITILLARY	<i>Boloria acrocnema</i>	L,E
EL PASO	BIRDS	EAGLE, BALD	<i>Haliaeetus leucocephalus</i>	L,T
		FALCON, PEREGRINE	<i>Falco peregrinus</i>	L,E
		OWL, MEXICAN SPOTTED	<i>Strix occidentalis lucida</i>	L,T,CH

Key: L - Listed, P - Proposed, E - Endangered, T - Threatened, CH - Critical Habitat

# IV. COUNTY/SPECIES LIST CONTINUED

The following list identifies federally listed or proposed U.S. species by State and County. It has been updated through September 1, 1997.

State/County	Group name	Inverse name	Scientific name	Action/ Status
FREMONT GARFIELD	FISHES	TROUT, GREENBACK CUTTHROAT	Salmo clarki stomias	L,T
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
	BIRDS	OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
GRAND		FALCON, PEREGRINE	Falco peregrinus	L,E
	FISHES	SQUAWFISH, COLORADO	Ptychocheilus lucius	L,CH
		SUCKER, RAZORBACK	Xyrauchen texanus	L,E,CH
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
GUNNISON	PLANTS	CACTUS, UINTA BASIN HOOKLESS	Sclerocactus glaucus(=Echinocactus g., S. whipplei)	L,T
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
	PLANTS	BEARDTONGUE, PENLAND	Penstemon penlandii	L,E
		MILK-VETCH, OSTERHOUT	Astragalus osterhoutii	L,E
HINSDALE	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
	INSECTS	BUTTERFLY, UNCOMPAHGRE FRITILLARY	Boloria acrocneuma	L,E
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
HUERFANO	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	INSECTS	BUTTERFLY, UNCOMPAHGRE FRITILLARY	Boloria acrocneuma	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
JACKSON		FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	FISHES	TROUT, GREENBACK CUTTHROAT	Salmo clarki stomias	L,T
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
JEFFERSON		FALCON, PEREGRINE	Falco peregrinus	L,E
	PLANTS	PHACELIA, NORTH PARK	Phacelia formosula	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
	INSECTS	SKIPPER, PAWNEE MONTANE	Hesperia leonardus (=pawnee) montana	L,T
KIOWA	PLANTS	LADIES'-TRESSES, UTE	Spiranthes diluvialis	L,T
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
	LA PLATA	BIRDS	EAGLE, BALD	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
LAKE		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	PLANTS	CACTUS, KNOWLTON	Pediocactus knowltonii	L,E
	BIRDS	OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
LARIMER	FISHES	TROUT, GREENBACK CUTTHROAT	Salmo clarki stomias	L,T
	INSECTS	BUTTERFLY, UNCOMPAHGRE FRITILLARY	Boloria acrocneuma	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
LAS ANIMAS	FISHES	TROUT, GREENBACK CUTTHROAT	Salmo clarki stomias	L,T
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
LINCOLN		FALCON, PEREGRINE	Falco peregrinus	L,E
	FISHES	CHUB, BONYTAIL	Gila elegans	L,E,CH
		CHUB, HUMPBACK	Gila cypha	L,E,CH
		SQUAWFISH, COLORADO	Ptychocheilus lucius	L,CH
LOGAN		SUCKER, RAZORBACK	Xyrauchen texanus	L,E,CH
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	PLANTS	CACTUS, SPINELESS HEDGEHOG	Echinocereus triglochidiatus var. inermis	L,E
		CACTUS, UINTA BASIN HOOKLESS	Sclerocactus glaucus(=Echinocactus g., S. whipplei)	L,T
MESA	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	FISHES	CHUB, BONYTAIL	Gila elegans	L,E,CH
MOFFAT		CHUB, HUMPBACK	Gila cypha	L,E,CH

Key: L - Listed, P - Proposed, E - Endangered, T - Threatened, CH - Critical Habitat

## IV. COUNTY/SPECIES LIST CONTINUED

The following list identifies federally listed or proposed U.S. species by State and County. It has been updated through September 1, 1997.

State/County	Group name	Inverse name	Scientific name	Action/ Status
MONTEZUMA	MAMMALS	SQUAWFISH, COLORADO	Ptychocheilus lucius	L,CH
		SUCKER, RAZORBACK	Xyrauchen texanus	L,E,CH
	BIRDS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
		EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	FISHES	SQUAWFISH, COLORADO	Ptychocheilus lucius	L,CH
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	PLANTS	CACTUS, MESA VERDE	Sclerocactus mesae-verdae (=Pediocactus m.)	L,T
		MILK-VETCH, MANCOS	Astragalus humillimus	L,E
MONTROSE	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
		FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	MAMMALS	CACTUS, SPINELESS HEDGEHOG	Echinocereus triglochidiatus var. inermis	L,E
		CACTUS, UINTA BASIN HOOKLESS	Sclerocactus glaucus(=Echinocactus g.,S. whipplei)	L,T
	PLANTS	WILD-BUCKWHEAT, CLAY-LOVING	Eriogonum pelinophilum	L,E,CH
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
	PLANTS	LADIES'-TRESSES, UTE	Spiranthes diluvialis	L,T
MORGAN	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
OTERO	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
OURAY	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
		BUTTERFLY, UNCOMPAHGRE FRITILLARY	Boloria acrocnema	L,E
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FISHES	TROUT, GREENBACK CUTTHROAT	L,T
	INSECTS	SKIPPER, PAWNEE MONTANE	Hesperia leonardus (=pawnee) montana	L,T
	PLANTS	MUSTARD, PENLAND ALPINE FEN	Eutrema penlandii	L,T
	INSECTS	BUTTERFLY, UNCOMPAHGRE FRITILLARY	Boloria acrocnema	L,E
PITKIN	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
PROWERS	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
PUEBLO	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FISHES	SQUAWFISH, COLORADO	L,CH
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	PLANTS	BLADDERPOD, DUDLEY BLUFFS	Lesquerella congesta	L,T
		TWINPOD, DUDLEY BLUFFS	Physaria obcordata	L,T
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
ROUTT	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		MAMMALS	FERRET, BLACK-FOOTED	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
		INSECTS	BUTTERFLY, UNCOMPAHGRE FRITILLARY	L,E
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
SAGUACHE	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
		INSECTS	BUTTERFLY, UNCOMPAHGRE FRITILLARY	L,E
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
SAN JUAN	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
		INSECTS	BUTTERFLY, UNCOMPAHGRE FRITILLARY	L,E
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	PLANTS	CACTUS, SPINELESS HEDGEHOG	Echinocereus triglochidiatus var. inermis	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T

Key: L - Listed, P - Proposed, E - Endangered, T - Threatened, CH - Critical Habitat

**IV. COUNTY/SPECIES LIST CONTINUED**

The following list identifies federally listed or proposed U.S. species by State and County. It has been updated through September 1, 1997.

State/County	Group name	Inverse name	Scientific name	Action/ Status
SUMMIT .....	BIRDS .....	EAGLE, BALD .....	Haliaeetus leucocephalus	L,T
	PLANTS .....	MUSTARD, PENLAND ALPINE FEN .....	Eutrema penlandii	L,T
TELLER .....	BIRDS .....	FALCON, PEREGRINE .....	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED .....	Strix occidentalis lucida	L,T,CH
	INSECTS .....	SKIPPER, PAWNEE MONTANE .....	Hesperia leonardus (=pawnee) montana	L,T
WASHINGTON .....	BIRDS .....	EAGLE, BALD .....	Haliaeetus leucocephalus	L,T
WELD .....	BIRDS .....	CRANE, WHOOPING .....	Grus americana	L,E,CH
		EAGLE, BALD .....	Haliaeetus leucocephalus	L,T
	PLANTS .....	LADIES'-TRESSES, UTE .....	Spiranthes diluvialis	L,T
YUMA .....	BIRDS .....	EAGLE, BALD .....	Haliaeetus leucocephalus	L,T



**ADDENDUM B - HISTORIC PROPERTIES (RESERVED)**

Instructions related to historic preservation have not been included in the permit at this time. EPA may modify the permit to include such provisions at a later date. This does not relieve applicants or permittees of their responsibility to comply with applicable State, Tribal or local laws for the protection of historic properties.

NPDES  
FORM



United States Environmental Protection Agency  
Washington, DC 20460

**Notice of Intent (NOI) for Storm Water Discharges Associated with  
CONSTRUCTION ACTIVITY Under a NPDES General Permit**

Submission of this Notice of Intent constitutes notice that the party identified in Section I of this form intends to be authorized by a NPDES permit issued for storm water discharges associated with construction activity in the State/Indian Country Land identified in Section II of this form. Submission of this Notice of Intent also constitutes notice that the party identified in Section I of this form meets the eligibility requirements in Part I.B. of the general permit (including those related to protection of endangered species determined through the procedures in Addendum A of the general permit), understands that continued authorization to discharge is contingent on maintaining permit eligibility, and that implementation of the Storm Water Pollution Prevention Plan required under Part IV of the general permit will begin at the time the permittee commences work on the construction project identified in Section II below. IN ORDER TO OBTAIN AUTHORIZATION, ALL INFORMATION REQUESTED MUST BE INCLUDED ON THIS FORM. SEE INSTRUCTIONS ON BACK OF FORM.

**I. Owner/Operator (Applicant) Information**

Name: \_\_\_\_\_ Phone: \_\_\_\_\_  
Address: \_\_\_\_\_ Status of Owner/Operator: ☐  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

**II. Project/Site Information**

Is the facility located on Indian  
Country Lands?  
Yes ☐ No ☐

Project Name: \_\_\_\_\_  
Project Address/Location: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_  
Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_ County: \_\_\_\_\_  
Has the Storm Water Pollution Prevention Plan (SWPPP) been prepared? Yes ☐ No ☐

Optional: Address of location of  
SWPPP for viewing ☐ Address in Section I above ☐ Address in Section II above ☐ Other address (if known) below:

SWPPP Address: \_\_\_\_\_ Phone: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Name of Receiving Water: \_\_\_\_\_

\_\_\_\_\_  
Month Day Year

\_\_\_\_\_  
Month Day Year

Estimated Construction Start Date Estimated Completion Date

Estimate of area to be disturbed (to nearest acre): \_\_\_\_\_

Estimate of Likelihood of Discharge (choose only one):

1. ☐ Unlikely 3. ☐ Once per week 5. ☐ Continual  
2. ☐ Once per month 4. ☐ Once per day

Based on instruction provided in Addendum A of the permit, are  
there any listed endangered or threatened species, or designated  
critical habitat in the project area?

Yes ☐ No ☐

I have satisfied permit eligibility with regard to protection of  
endangered species through the indicated section of Part I.B.3.e.(2)  
of the permit (check one or more boxes):

(a) ☐ (b) ☐ (c) ☐ (d) ☐

**III. Certification**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage this system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name: \_\_\_\_\_ Date: \_\_\_\_\_

Signature: \_\_\_\_\_

**Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity to be Covered Under a NPDES Permit****Who Must File a Notice of Intent Form**

Under the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et seq.; the Act), except as provided by Part I.B.3 the permit, Federal law prohibits discharges of pollutants in storm water from construction activities without a National Pollutant Discharge Elimination System Permit. Operator(s) of construction sites where 5 or more acres are disturbed, smaller sites that are part of a larger common plan of development or sale where there is a cumulative disturbance of at least 5 acres, or any site designated by the Director, must submit an NOI to obtain coverage under an NPDES Storm Water Construction General Permit. If you have questions about whether you need a permit under the NPDES Storm Water program, or if you need information as to whether a particular program is administered by EPA or a State agency, write to or telephone the Notice of Intent Processing Center at (703) 931-3230.

**Where to File NOI Form**

NOIs must be sent to the following address:

Storm Water Notice of Intent (4203)  
USEPA  
401 M. Street, SW  
Washington, D.C. 20460

Do not send Storm Water Pollution Prevention Plans (SWPPPs) to the above address. For overnight/express delivery of NOIs, please include the room number 2104 Northeast Mall and phone number (202) 260-9541 in the address.

**When to File**

This form must be filed at least 48 hours before construction begins.

**Completing the Form**

OBTAIN AND READ A COPY OF THE APPROPRIATE EPA STORM WATER CONSTRUCTION GENERAL PERMIT FOR YOUR AREA. To complete this form, type or print, using uppercase letters, in the appropriate areas only. Please place each character between the marks (abbreviate if necessary to stay within the number of characters allowed for each item). Use one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions on this form, call the Notice of Intent Processing Center at (703) 931-3230.

**Section I. Facility Owner/Operator (Applicant) Information**

Provide the legal name, mailing address, and telephone number of the person, firm, public organization, or any other entity that meet either of the following two criteria: (1) they have operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or (2) they have the day-to-day operational control of those activities at the project necessary to ensure compliance with SWPPP requirements or other permit conditions. Each person that meets either of these criteria must file this form. Do not use a colloquial name. Correspondence for the permit will be sent to this address.

Enter the appropriate letter to indicate the legal status of the owner/operator of the project: F = Federal; S = State; M = Public (other than federal or state); P = Private.

**Section II. Project/Site Information**

Enter the official or legal name and complete street address, including city, county, state, zip code, and phone number of the project or site. If it lacks a street address, indicate with a general statement the location of the site (e.g., Intersection of State Highways 61 and 34). Complete site information must be provided for permit coverage to be granted.

The applicant must also provide the latitude and longitude of the facility in degrees, minutes, and seconds to the nearest 15 seconds. The latitude and longitude of your facility can be located on USGS quadrangle maps. Quadrangle maps can be obtained by calling 1-800 USA MAPS. Longitude and latitude may also be obtained at the Census Bureau Internet site: <http://www.census.gov/cgi-bin/gazetteer>.

Latitude and longitude for a facility in decimal form must be converted to degrees, minutes and seconds for proper entry on the NOI form. To convert decimal latitude or longitude to degrees, minutes, and seconds, follow the steps in the following example.

Convert decimal latitude 45.1234567 to degrees, minutes, and seconds.

- 1) The numbers to the left of the decimal point are degrees.
- 2) To obtain minutes, multiply the first four numbers to the right of the decimal point by 0.006.  $1234 \times 0.006 = 7.404$ .
- 3) The numbers to the left of the decimal point in the result obtained in step 2 are the minutes: 7.
- 4) To obtain seconds, multiply the remaining three numbers to the right of the decimal from the result in step 2 by 0.06:  $404 \times 0.06 = 24.24$ . Since the numbers to the right of the decimal point are not used, the result is 24".
- 5) The conversion for 45.1234 = 45° 7' 24".

Indicate whether the project is on Indian Country Lands.

Indicate if the Storm Water Pollution Prevention Plan (SWPPP) has been developed. Refer to Part IV of the general permit for information on SWPPPs. To be eligible for coverage, a SWPPP must have been prepared.

Optional: Provide the address and phone number where the SWPPP can be viewed if different from addresses previously given. Check appropriate box.

Enter the name of the closest water body which receives the project's construction storm water discharge.

Enter the estimated construction start and completion dates using four digits for the year (i.e. 05/27/1998).

Enter the estimated area to be disturbed including but not limited to: grubbing, excavation, grading, and utilities and infrastructure installation. Indicate to the nearest acre; if less than 1 acre, enter "1." Note: 1 acre = 43,560 sq. ft.

Indicate your best estimate of the likelihood of storm water discharges from the project. EPA recognizes that actual discharges may differ from this estimate due to unforeseen or chance circumstances.

Indicate if there are any listed endangered or threatened species, or designated critical habitat in the project area.

Indicate which Part of the permit that the applicant is eligible with regard to protection of endangered or threatened species, or designated critical habitat.

**Section III. Certification**

Federal Statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

For a partnership or sole proprietorship: by a general partner of the proprietor, or

For a municipality, state, federal, or other public facility: by either a principal executive or ranking elected official. An unsigned or undated NOI form will not be granted permit coverage.

**Paperwork Reduction Act Notice**

Public reporting burden for this application is estimated to average 3.7 hours. This estimate includes time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form, including any suggestions which may increase or reduce this burden to: Director, OPPE Regulatory Information Division (2137), U.S. Environmental Protection Agency, 401 M Street, SW, Washington, D.C. 20460. Include the OMB control number on any correspondence. Do not send the completed form to this address.

NPDES  
FORMUnited States Environmental Protection Agency  
Washington, DC 20460**Notice of Termination (NOT) of Coverage Under a NPDES General Permit for Storm Water Discharges Associated with Industrial Activity**

Submission of this Notice of Termination constitutes notice that the party identified in Section II of this form is no longer authorized to discharge storm water associated with industrial activity under the NPDES program. ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.

**I. Permit Information**NPDES Storm Water  
General Permit Number: \_\_\_\_\_Check Here if You are No Longer  
the Operator of the Facility: ☐Check Here if the Storm Water  
Discharge is Being Terminated: ☐**II. Facility Operator Information**

Name: \_\_\_\_\_ Phone: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP Code: \_\_\_\_\_

**III. Facility/Site Location Information**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP Code: \_\_\_\_\_

Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_ Quarter: \_\_\_\_\_ Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_

**IV. Certification:** I certify under penalty of law that all storm water discharges associated with industrial activity from the identified facility that are authorized by a NPDES general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting this Notice of Termination, I am no longer authorized to discharge storm water associated with industrial activity under this general permit, and that discharging pollutants in storm water associated with industrial activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the Clean Water Act.

Print Name: \_\_\_\_\_ Date: \_\_\_\_\_

Signature: \_\_\_\_\_

**Instructions for Completing Notice of Termination (NOT) Form****Who May File a Notice of Termination (NOT) Form**

Permittees who are presently covered under an EPA-issued National Pollutant Discharge Elimination System (NPDES) General Permit (including the 1995 Multi-Sector Permit) for Storm Water Discharges Associated with Industrial Activity may submit a Notice of Termination (NOT) form when their facilities no longer have any storm water discharges associated with industrial activity as defined in the storm water regulations at 40 CFR 122.26(b)(14), or when they are no longer the operator of the facilities.

For construction activities, elimination of all storm water discharges associated with industrial activity occurs when disturbed soils at the construction site have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, or that all storm water discharges associated with industrial activity from the construction site that are authorized by a NPDES general permit have otherwise been eliminated. Final stabilization means that all soil-disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70% of the cover for unpaved areas and areas not covered by permanent structures has been established, or equivalent permanent stabilization measures (such as the use of nrap, gabions, or geotextiles) have been employed.

**Where to File NOT Form**

Send this form to the the following address:

Storm Water Notice of Termination (4203)  
401 M Street, S.W.  
Washington, DC 20460

**Completing the Form**

Type or print, using upper-case letters, in the appropriate areas only. Please place each character between the marks. Abbreviate if necessary to stay within the number of characters allowed for each item. Use only one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions about this form, telephone or write the Notice of Intent Processing Center at (703) 931-3230.

**Instructions - EPA Form 3510-7**  
**Notice of Termination (NOT) of Coverage Under The NPDES General Permit**  
**for Storm Water Discharges Associated With Industrial Activity**

**Section I Permit Information**

Enter the existing NPDES Storm Water General Permit number assigned to the facility or site identified in Section III. If you do not know the permit number, telephone or write your EPA Regional storm water contact person.

Indicate your reason for submitting this Notice of Termination by checking the appropriate box:

If there has been a change of operator and you are no longer the operator of the facility or site identified in Section III, check the corresponding box.

If all storm water discharges at the facility or site identified in Section III have been terminated, check the corresponding box.

**Section II Facility Operator Information**

Give the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same name as the facility. The operator of the facility is the legal entity which controls the facility's operation, rather than the plant or site manager. Do not use a colloquial name. Enter the complete address and telephone number of the operator.

**Section III Facility/Site Location Information**

Enter the facility's or site's official or legal name and complete address, including city, state and ZIP code. If the facility lacks a street address, indicate the state, the latitude and longitude of the facility to the nearest 15 seconds, or the quarter, section, township, and range (to the nearest quarter section) of the approximate center of the site.

**Section IV Certification**

Federal statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

*For a corporation:* by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

*For a partnership or sole proprietorship:* by a general partner or the proprietor; or

*For a municipality, State, Federal, or other public facility:* by either a principal executive officer or ranking elected official.

**Paperwork Reduction Act Notice**

Public reporting burden for this application is estimated to average 0.5 hours per application, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form, including any suggestions which may increase or reduce this burden to: Chief, Information Policy Branch, 2136, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460, or Director, Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

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## DEPARTMENT OF THE AIR FORCE

10TH CIVIL ENGINEER GROUP

USAF ACADEMY COLORADO

28 January 2002

MEMORANDUM FOR COMMANDER

ARMY CORPS OF ENGINEERS, OMAHA DISTRICT,  
ATTN: CENWO-ED-DI (DENNIS)  
106 SOUTH 15 STREET  
OMAHA NE 68102-1618

FROM: 510 CES/CEV  
8120 Edgerton Drive, Suite 40  
USAF Academy CO 80840-2400

SUBJECT: National Pollution Discharge Elimination System (NPDES)--Consideration of  
Endangered Species (Aircraft Control Tower (Project SQPZ984005))

1. In compliance with EPA's National Pollution Discharge Elimination System (NPDES) program for Storm Water Discharge General Permits on construction sites with land disturbance greater than five acres, the USAF Academy has completed the following steps regarding listed threatened and endangered species and their critical habitat:

a. Step One. The project site is located in El Paso County, Colorado. The site is not located in or near any designated critical habitat. Critical habitat in the county has only been designated for the Mexican Spotted Owl, and occurs far south of the Academy.

(1) Mexican Spotted Owl (*Strix occidentalis lucida*), listed without critical habitat: 58 FR 14271, 16 March 1993; critical habitat designated in Front Range of eastern Colorado: 66 CFR 8530.

(2) Bald Eagle (*Haliaeetus leucocephalus*), listed without critical habitat: 32 FR 4001, 11 March 1967.

(3) Greenback Cutthroat Trout (*Oncorhynchus clarki stomias*), listed without critical habitat: 32 FR 4001, 11 March 1967.

(4) Preble's Meadow Jumping Mouse (*Zapus hudsonius preblei*), listed without critical habitat: 63 FR 92 (pages 26517-26530), 13 May 1998.

(5) Ute Ladies'-tresses (*Spiranthes diluvialis*), listed without critical habitat: 57 FR 2053, 17 January 1992.

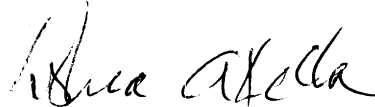
b. Step Two. Five listed species are known to occur or are possible in El Paso County, Colorado: Bald Eagle, Mexican Spotted Owl, Greenback Cutthroat Trout, Preble's Meadow Jumping Mouse (PMJM), and Ute Ladies'-tresses. The PMJM occurs on the Academy, and a

Conservation Agreement and Plan have been entered into with the US Fish and Wildlife Service to conserve and protect the species. Remnant experimental populations of the Greenback Cutthroat Trout may occur in non-potable reservoirs #2, #3 and #4. These fish were introduced several years ago as part of the recreational fishery program. Bald eagles likely migrate across the Academy property, but are not a resident species. Surveys have been conducted for Ute Ladies'-tresses, but no plants were identified on the base.

c. Step Three. There are no listed species present in the immediate project area, and storm water discharges will not reach the Preble's Meadow Jumping Mouse habitat along Monument Creek and Kettle Creek.

d. Step Four. Because there are no listed species or critical habitat at or in the vicinity of the project site, the Academy has concluded there will be no adverse impact resulting from storm water discharges or construction activities.

2. If you have any further questions concerning possible project impacts on listed species, please contact Dr. Brian Muhlbachler at (719) 333-3308.

  
JOSHUA A. KELLAR  
Chief, Environmental Flight  
510<sup>th</sup> Civil Engineer Squadron



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**12/88**

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SECTION 02210

GRADING  
**12/88**

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 422	(1963; R 1990) Particle-Size Analysis of Soils
ASTM D 1556	(1990; R 1996) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 2167	(1994) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2216	(1992) Laboratory Determination of Water (Moisture) Content of Soil, and Rock
ASTM D 2487	(1993) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2488	(1993) Description and Identification of Soils (Visual-Manual Procedure)
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1996) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(1996) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.2 UNIT PRICE

1.2.1 MEASUREMENT

1.2.1.1 Excavation

The unit of measurement for excavation will be the cubic meter computed by the average end-area method from cross sections taken before and after the

excavation and borrow operations. The amount paid for will be the number of cubic meters of material, measured in its original position and removed from the excavation and borrow areas, including the excavation for ditches, gutters, and channel changes, which material is acceptably utilized or disposed of as herein specified. The measurement will include the excavation below grade of unsuitable material where ordered, and allowance will be made on the same basis for selected backfill ordered as replacement. The measurement will not include the amount excavated without authorization or the amount of any material used for other than directed purposes. Amount of overburden stripped from borrow pits, unless used as borrow material, will not be paid for. The measurement will not include the amount of any excavation performed prior to the taking of elevations and measurements of the undisturbed grade.

#### 1.2.1.2 Topsoil

Separate excavation, hauling, and spreading or piling of topsoil and all miscellaneous operations attendant thereto will be considered subsidiary obligations of the Contractor, covered under the contract unit price for excavation.

#### 1.2.1.3 Overhaul

The unit of measurement for overhaul will be the station meter. The number of station meters of overhaul to be paid for will be the product of the number of cubic meters of overhaul materials, measured in the original position, multiplied by the overhaul distance measured in stations of 100 meters. The overhaul distance will be the distance in stations between the center of volume of the overhauled material in its original position and the center of volume after placing, minus the free-haul distance in stations. The haul distance will be measured along the shortest route determined as feasible and satisfactory.

### 1.2.2 PAYMENT

#### 1.2.2.1 Excavation

Excavation will be paid for at the contract unit price per cubic meter for "Excavation."

#### 1.2.2.2 Overhaul

Overhaul will be paid for at the contract unit price per station meter for "Overhaul."

### 1.3 DEFINITIONS

#### 1.3.1 Suitable Materials

Suitable materials are materials that classify according to ASTM D 2487 as GW, GP, GC, GM, SW, [SP, ]SC, SM, CL, [CH, ]and ML. Lime and flyash shall also be considered as suitable materials when used as stabilizing agents.

#### 1.3.2 Unsuitable Materials

Unsuitable materials include all materials that are not defined above as suitable materials. In addition, unsuitable materials are materials that classify according to ASTM D 2487 as MH, OH, [CH, ]Pt, [SP, ]and OL. Unsuitable materials also include all material that contains debris,

refuse, roots, organic matter, frozen material, fine grained sedimentary rocks (i.e., shale, claystone, siltstone, mudstone, and marl) even though they may be intensely weathered, contamination from hazardous, toxic, biological or radiological substances, stone having a maximum dimension larger than 75 mm in any dimension, or other materials that are determined by the Contracting Officer as unsuitable for providing a stable subgrade or stable foundation for pavement. Otherwise suitable material which has excess moisture content shall not be classified as unsuitable material unless it cannot be dried by manipulation, aeration, or blending with other materials as determined by the Contracting Officer.

#### 1.3.3 Cohesionless and Cohesive Materials

Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic.

#### 1.3.4 Expansive Soils

Expansive soils are defined as soils that have a plasticity index greater than 24 and a liquid limit greater than 49 when tested in accordance with ASTM D 4318.

#### 1.3.5 Non-expansive Soils

Non-expansive soils are defined as soils with a plasticity index less than or equal to 24 and a liquid limit less than or equal to 49 when tested in accordance with ASTM D 4318.

#### 1.3.6 Overhaul

Overhaul is the authorized transportation of suitable excavation or borrow materials in excess of the free-haul limit of [\_\_\_\_\_] stations. Overhaul is the product of the quantity of materials hauled beyond the free-haul limit and the distance such materials are hauled beyond the free-haul limit, expressed in station meters.

#### 1.3.7 Acceptable Topsoil

Acceptable topsoil is defined as selectively excavated natural, friable soil that is representative of soils in the vicinity that produce heavy growths of crops, grass or other vegetation and is reasonably free from underlying subsoil, clay lumps, objectionable weeds, litter, brush, matted roots, toxic substances or any material that might be harmful to plant growth or be a hindrance to grading, planting or maintenance operations. Soil from ditch bottoms, drained ponds, eroded areas, or soil which is excessively wet or saturated is not acceptable. Topsoil shall not contain more than five percent by volume of stones, stumps or other objects larger than 25 mm in any dimension for field seeded areas and 15 mm in any dimension for lawn seeded areas. [Topsoil shall not be excessively acid or alkaline (pH value 6.0 to 7.5). Topsoil shall contain 5 to 20 percent organic matter as determined by the organic carbon 6A chemical analysis method described in USDA Soil Survey Investigation Report No. 1.] Topsoil shall be approved by the Contracting Officer. [See Section 02921A SEEDING for additional requirements.]

#### 1.3.8 Spot Subgrade Reinforcement Material

Spot subgrade reinforcement material includes sound, tough, durable crushed stone, slag or gravel, consisting of pieces varying from 25 mm to 90 mm in diameter, or other approved material, with necessary filler. When a finer material is necessary for filler, broken stone chips, screened gravel, or sand may be used to completely fill all voids.

#### 1.3.9 Pavements

Pavements shall include all roads, walk areas, graveled parking or walk areas, or any other type of surfaced area for driving or walking.

#### 1.3.10 Standard Frame and Grate or Cover

Standard frame and grate or cover shall mean heavy-duty type frame and grate or cover as a minimum.

#### 1.3.11 Degree of Compaction

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557.

### 1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330SUBMITTAL PROCEDURES:

#### SD-01 Preconstruction Submittal

Disposal Facility; G-A.

Location of disposal facility and appropriate documentation.

#### SD-06 Test Reports

Field Testing Control

Suitable Materials

Certified test reports and analysis certifying that the suitable materials proposed for use at the project site conform to the specified requirements, and for all tests conducted in accordance with paragraph FIELD TESTING CONTROL.

Borrow material; G-A1.

For each type of material[, with the exception of material reused from on-site excavation,] the following tests shall be performed:

Compaction curve, ASTM D 1557

Liquid limit, ASTM D 4318

Plastic limit, ASTM D 4318

Insitu moisture content, ASTM D 2216

Visual description of material, ASTM D 2488

Particle-size analysis, ASTM D 422

Soil classification, ASTM D 2487

SD-07 Certificates

#### Field Testing Control

Qualifications of the commercial testing laboratory who will be performing all testing in accordance with paragraph FIELD TESTING CONTROL.

## PART 2 PRODUCTS

### 2.1 BORROW MATERIAL

Borrow material shall be selected to meet requirements and conditions of the particular fill for which it is to be used. Necessary clearing, grubbing, disposal of debris, and satisfactory drainage of borrow pits shall be performed by the Contractor as incidental operations to the borrow excavation.

#### 2.1.1 Selection

Borrow materials shall be obtained from [the borrow areas shown][or] [sources outside the limits of Government-controlled land][or][sources within the limits of Government-controlled land, subject to approval]. Borrow materials shall be subject to approval. [Borrow material from approved sources on Government-controlled land may be obtained without payment of royalties. Unless specifically provided, no borrow shall be obtained within the limits of the project site without prior written approval.][The source of borrow material shall be the Contractor's responsibility. Unless otherwise provided in the contract, the Contractor shall obtain from the owners the right to procure material, shall pay all royalties and other charges involved, and shall bear all the expense of developing the sources, including rights-of-way for hauling.][Spot subgrade reinforcement material [and \_\_\_\_\_] shall be obtained from approved sources outside the limits of Government-controlled land at the Contractor's expense.]

#### 2.1.2 Borrow Pits

[The Contractor shall notify the Contracting Officer sufficiently in advance of the opening of any excavation or borrow pit to permit elevations and measurements to be taken of the undisturbed ground surface.] Except as otherwise permitted, borrow pits shall be excavated to afford adequate drainage. Overburden and other spoil material shall be disposed of or used for special purposes. Borrow pits shall be neatly trimmed [and left in such shape as will facilitate taking accurate measurements] after the excavation is completed.

### PART 3 EXECUTION

#### 3.1 CONSERVATION OF TOPSOIL

Topsoil shall be removed [\_\_\_\_\_] millimeters, without contamination with subsoil, and stockpiled convenient to areas for later application or at locations specified. Topsoil shall be removed and stored separate from other excavated materials and piled free of roots, stones, and other undesirable materials. Any surplus of topsoil from excavations and grading shall be [stockpiled in locations indicated] [removed from the site].

#### 3.2 EXCAVATION

Excavation of every description, regardless of material encountered, within the grading limits of the project shall be performed to the lines and grades indicated [including removal of existing bituminous surface course, concrete pavement and integral curb, pavement subcourses to the full depth, concrete walk, culverts, storm drains, subdrains, and storm drain and subdrain structures]. Suitable excavated material shall be transported to and placed in fill areas within the limits of the work. Unsuitable material encountered within the limits of the work shall be excavated below the grade shown and replaced with suitable material as directed. Such material excavated and the selected material ordered as replacement will be paid for by an equitable adjustment of the contract price under the clause of the CONTRACT CLAUSES of the contract entitled "Changes." Unsuitable material [and surplus excavated material not required for fill] shall be disposed of by the Contractor at his own expense and responsibility outside the limits of Government-controlled land. [Surplus excavated material not required for fill shall be disposed of by the Contractor in [designated waste areas] [areas approved for surplus material storage at his own expense and responsibility outside the limits of Government-controlled land].] [in designated [waste] area[s] [or in areas approved for surplus material storage] [at his own expense and responsibility outside of the limit of Government-controlled lands]]. [Disposal of materials outside Government-controlled lands shall be in accordance with federal, state, and local regulations. The location of any disposal facility located outside of the limit of Government-controlled lands shall be submitted to the Contracting Officer prior to removal from the project site. The Contractor shall submit documentation from the disposal facility to verify that it is licensed to accept the material. No material shall be removed from the project site without prior approval from the Contracting Officer. The Contractor shall notify the Contracting Officer if any material to be disposed of is found to contain hazardous, toxic, biological or radiological substances.] During construction, excavation and filling shall be performed in a manner and sequence that will [utilize all suitable material from required excavation prior to obtaining material from borrow and will] provide drainage at all times. [Material required for fills in excess of that produced by excavation within the grading limits shall be excavated from [the borrow areas indicated] [or from other] [approved areas selected by the Contractor, and approved by the Contracting Officer as specified below]].

#### 3.3 EXCAVATION OF DITCHES

Ditches shall be cut accurately to the cross sections and grades indicated. All roots, stumps, rock and foreign matter in the sides and bottom of ditches shall be cut to conform to the slope, grade, and shape of the



section shown. Care shall be taken not to excavate ditches below the grades indicated. Excessive ditch excavation shall be backfilled to grade with suitable, thoroughly compacted material as directed. All ditches excavated under this section shall be maintained until final acceptance of the work. Suitable material excavated from ditches shall be placed in fill areas as directed. Unsuitable and excess excavated material shall be disposed of as specified above. No excavated material shall be deposited closer than 1 meter from the edges of the ditches.

#### 3.4 UTILIZATION OF EXCAVATED MATERIALS

Suitable material removed from required excavation under this section [and any excess material from building excavation] shall be utilized in the formation of embankments, [subgrades,][shoulders,] slopes, [bedding,] backfill for [culverts and other] structures, and for such other purposes as directed. No excavated material shall be wasted without the authorization of the Contracting Officer. Material authorized to be wasted shall be disposed of as directed and in such manner as not to obstruct the flow characteristics of any stream or to impair the efficiency or appearance of any structure. No excavated material shall be deposited at any time in a manner that may endanger a partly finished structure by direct pressure, by overloading banks contiguous to the operations, or that may in any other way be detrimental to the completed work.

#### 3.5 BACKFILL ADJACENT TO STRUCTURES

Backfill adjacent to structures shall be placed and compacted uniformly in such manner as to prevent wedging action or eccentric loading upon or against the structures. Slopes bounding or within areas to be backfilled shall be stepped or serrated to prevent sliding of the fill. During backfilling operations and in the formation of embankments, equipment that will overload the structure in passing over and compacting these fills shall not be used. [Backfill for [culverts,][storm drains][and] [subdrains], including the bedding, shall conform to the additional requirements as specified in Section 02630A STORM-DRAINAGE SYSTEM and Section 02620A SUBDRAINAGE SYSTEM.] Backfill for structures [other than [culverts][storm drains][and][subdrains]] shall conform to the additional requirements in Section 02316A EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

#### 3.6 PREPARATION OF GROUND SURFACE FOR FILL

All vegetation, such as roots, brush, heavy sods, heavy growth of grass, and all decayed vegetable matter, rubbish, and other unsuitable material within the area upon which fill is to be placed, shall be stripped or otherwise removed before the fill is started. In no case will unsuitable material remain in or under the fill area. Stumps, logs and roots more than 40 mm in diameter shall be excavated and removed to a depth not less than 450 mm below the original ground surface. Sloped ground surfaces steeper than one vertical to four horizontal on which fill is to be placed shall be plowed, stepped, or broken up, as directed, in such manner that the fill material will bond with the existing surface. Prepared surfaces on which compacted fill is to be placed shall be wetted or dried as may be required to obtain the specified moisture content and density.

#### 3.7 FILLS AND EMBANKMENTS

Fills and embankments herein designated as fills shall be constructed at the locations and to lines and grades indicated on the drawings. The

completed fill shall correspond to the shape of the typical sections shown on the drawings and shall meet the requirements of the particular case. Suitable material removed from the excavation shall be used in forming the necessary fill. Where otherwise suitable material is too wet, it shall be aerated or dried to provide the moisture content specified for compaction. The material shall be placed in successive horizontal layers of 200 mm to 300 mm in loose depth for the full width of the cross section, and compacted. Each layer shall be compacted before the overlaying lift is placed.

### 3.8 COMPACTION

Compaction shall be accomplished by means specified and to the following densities for various parts of the work. Deficiencies in construction shall be corrected by the Contractor at no additional cost to the Government.

#### 3.8.1 Over-all or Overlot Areas

Each layer of fills constructed under this section [except for topsoil] shall be compacted to at least 90 percent of the maximum density as determined in paragraph Degree of Compaction. Cohesive soils shall be at a moisture content between [1][\_\_\_\_\_] percent below and [4][\_\_\_\_\_] percent above optimum moisture when compacted. Cohesionless soils shall be compacted at a moisture content as required to facilitate compaction without bulking.

#### 3.8.2 Areas to Receive [Pavements][Railroads]

All fills for paved areas shall be compacted as specified for OVER-ALL OR OVERLOT AREAS, with the following exception. The upper layer forming the subgrade for [pavements][railroads] in both cut and fill areas, shall be compacted to at least 95 percent of maximum density as determined in paragraph Degree of Compaction.

##### 3.8.2.1 Subgrade Preparation

The subgrade shall be shaped to line, grade and cross section with approved compaction equipment so as to provide a minimum compacted subgrade thickness of [\_\_\_\_\_] millimeters. This operation shall include any reshaping, aeration, wetting, or drying required. [The subgrade in cut sections shall be scarified and excavated for the full depth of compacted subgrade indicated on the drawings, and the excavated material shall be windrowed and bladed successively until thoroughly blended, then relaid and compacted. The subgrade in fill sections shall be windrowed and bladed successively until thoroughly blended, then compacted.] [Expansive cohesive soils shall be at a moisture content between 3 and 8 percent above optimum moisture when compacted.] The moisture content of [non-expansive] cohesive soils shall be adjusted within the range 1 percent below to 3 percent above optimum moisture when compacted. Cohesionless soils shall be compacted as required to facilitate compaction without bulking. All unsuitable material shall be removed and replaced with suitable material from excavation [or borrow] or, if so directed, with spot subgrade reinforcement material, all as approved by the Contracting Officer. Spot subgrade reinforcement, if required, will be paid for by an equitable adjustment of the contract price under the clause Entitled "Changes" of the CONTRACT CLAUSES. All boulders or ledge stone encountered in the excavation shall be removed or broken off to a depth of not less than 150 mm below the subgrade. The resulting area and all other low sections, holes, or depressions shall be brought to the

required grade with suitable material and the entire subgrade shaped to line, grade and cross section and thoroughly compacted as herein provided. [Subgrade compaction shall be extended to include the shoulders.]

#### 3.8.2.2 Spot Subgrade Reinforcement

The use of spot subgrade reinforcement material shall be at the direction of and subject to the approval of the Contracting Officer. Unsuitable subgrade materials shall be removed, the bottom of the resulting excavation shaped uniformly and compacted firmly to the density specified for subgrade, and the required provisions for adequate drainage shall be made. The subgrade reinforcement material shall then be placed in the prepared excavation, in layers of not more than 200 mm, which shall be spread and rammed until level with the surrounding subgrade surface. The voids shall then be filled with necessary finer selected material and the area rolled, or tamped if inaccessible to the roller. The filling and rolling or tamping shall be continued until the entire mass is thoroughly compacted to not less than the density of the surrounding or adjacent areas. The surface shall be finished to conform accurately to the grade and cross section shown on the drawings.

#### 3.9 PLACING TOPSOIL

All ground areas disturbed by construction under this contract and not built over, paved or otherwise surfaced shall be topsoiled.

##### 3.9.1 Clearing

Prior to placing topsoil, vegetation shall be removed from the area and the ground surface cleared of all other materials that would hinder proper grading, tillage or subsequent maintenance operations.

##### 3.9.2 Grading

Previously constructed grades shall be repaired if necessary so that the areas to be topsoiled shall conform to the section indicated on the drawings upon completion of topsoil placement.

##### 3.9.3 Tillage

Subsequent to the above grading, the areas to be top-soiled shall be thoroughly scarified by approved means to a depth of at least 75 mm for bonding of topsoil with subsoil. The work shall be performed only during periods when beneficial results are likely to be obtained. When conditions are such, by reason of drought, excessive moisture, or other factors, that satisfactory results are not likely to be obtained, the work will be stopped by the Contracting Officer and shall be resumed only when directed. Undulations or irregularities in the surface that would interfere with further construction operations or maintenance shall be leveled before the next specified operation.

##### 3.9.4 Placing Topsoil

Topsoil shall be uniformly distributed on the designated areas and evenly spread to a minimum thickness of [100][\_\_\_\_\_] mm~\. Spreading shall be performed in such manner that planting can proceed with little additional soil preparation or tillage. The resulting surface shall meet the finish surface requirements specified in the following paragraph: FINISHED EXCAVATION, FILLS AND EMBANKMENTS. Topsoil shall not be placed when the

subgrade is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to proper grading or the proposed planting.

### 3.10 FIELD TESTING CONTROL

#### 3.10.1 Sampling and Testing

All quality control sampling and testing shall be performed by the Contractor in accordance with Section 01451 CONTRACTOR QUALITY CONTROL and as specified herein.

#### 3.10.2 Moisture-Density Determinations

Tests for determination of maximum density and optimum moisture shall be performed by the Contractor in accordance with ASTM D 1557, except that a mechanical tamper may be used provided the results are correlated with those obtained with the referenced hand tamper. Samples shall be representative of the materials to be placed. An optimum moisture-density curve shall be obtained for each principal type of material or combination of materials encountered or utilized. Results of these tests shall be the basis of control for compaction. The above testing shall include Atterberg limits, grain size determinations and specific gravity. A copy of these tests shall be furnished to the Contracting Officer with the construction quality control daily report.

#### 3.10.3 Density Control

The Contractor shall adequately control his compaction operations by tests made in accordance with any of the following methods: ASTM D 1556, ASTM D 2167, or ASTM D 2922 and ASTM D 3017 to insure placement of materials within the limits of densities specified. [The Contractor shall obtain a service permit to use radiation producing machinery or radioactive materials in accordance with Section 01400 SPECIAL SAFETY REQUIREMENTS FOR DEMOLITION AND RENOVATION.] When ASTM D 2922 is used, the calibration curves shall be checked, and adjusted if necessary, using the sand cone method as described in paragraph "Calibration" of ASTM D 2922. ASTM D 2922 results in a wet unit weight of soil and when using this method, ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with the density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job, on each different type of material encountered, at intervals as directed by the Contracting Officer. If ASTM D 2922 is used for field density control, there should be at least one test performed according to ASTM D 1556 per every 10 tests performed according to ASTM D 2922-\ for correlation of test results. One test shall be made for each [3,000][\_\_\_\_\_] sq meters. or less for each layer of specified depth, except areas to receive pavements, for which one test shall be made for each [1,000][\_\_\_\_\_] sq meters or less for each layer. Additional tests shall be made as necessary. All test results shall be made available to the Contracting Officer. Acceptance tests may be made by the Government for verification of compliance; however, the Contractor shall not depend on such tests for his control of operations. Deficiencies in construction shall be corrected by the Contractor at no additional cost to the Government.

### 3.11 FINISHED EXCAVATION, FILLS, AND EMBANKMENTS

All areas covered by the project, including excavated and filled sections

and adjacent transition areas, shall be uniformly smooth graded. The finished surface shall be reasonably smooth, compacted, and free from irregular surface changes. The degree of finish shall be that ordinarily obtainable from either blade-grader or scraper operations, except as otherwise specified. The finished surface shall be not more than 45 mm above or below the established grade or approved cross section and shall be free of depressed areas where water would pond. [All ditches shall be finished so as to drain readily.] The surface of embankments or excavated areas for road construction or other areas to be paved on which a base course or pavement is to be placed shall not vary more than 15 mm from the established grade and approved cross section.

### 3.12 PROTECTION

During construction, embankments and excavations shall be kept shaped and drained. Ditches and drains along the subgrade shall be maintained in such manner as to drain effectively at all times. Where ruts occur in the subgrade, the subgrade shall be brought to grade, reshaped if required, and recompacted prior to the placing of surfacing. The storage or stockpiling of materials on the subgrade will not be permitted. No surfacing shall be laid until the subgrade has been checked and approved, and in no case shall any surfacing be placed on a muddy subgrade or on one containing frost. Newly graded areas shall be protected from traffic and from erosion, and any settlement or washing away that may occur from any cause, prior to acceptance, shall be repaired and grades reestablished to the required elevations and slopes. All work shall be conducted in accordance with the environmental protection requirements of the contract.

#### 3.12.1 Protection of Existing Service Lines and Utilities Structures

Existing utility lines that are shown on the drawings, or the locations of which are made known to the Contractor prior to excavation that are to be retained, [as well as utility lines constructed during excavation operations,] shall be protected from damage during excavation and backfilling, and if damaged, shall be repaired by the Contractor at his expense. In the event that the Contractor damages any existing utility lines that are not shown, or the locations of which are not made known to the Contractor, report thereof shall be made immediately to the Contracting Officer. If determined that repairs are to be made by the Contractor, such repairs will be made in accordance with the clause Entitled "Changes" of the CONTRACT CLAUSES. [When utility lines that are to be removed or relocated are encountered within the area of operations, the Contractor shall notify the Contracting Officer in ample time for the necessary measures to be taken to prevent interruption of the service.]

### 3.13 ADJUSTMENT OF EXISTING STRUCTURES

All manholes, valve boxes, or inlets of any nature within the project that do not conform to the new finish grade in either surfaced or unsurfaced areas shall be adjusted to the new finish grade. Where inlets, manholes, or valve boxes fall within a surfaced or unpaved roadway or parking, the existing frames and cover shall be removed and replaced with a heavy-duty frame and cover. The structure shall be adjusted as needed to fit the new conditions. All structures shall be of a type suitable for the intended use and shall conform to the requirements of the applicable section of these specifications.

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SECTION 02440

TRAFFIC SIGNS

**10/01**

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M	(2000) Carbon Structural Steel
ASTM A 123/A 123M	(2001) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM B 209	(2001) Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B 209M	(2001) Aluminum and Aluminum-Alloy Sheet and Plate (Metric)
ASTM D 4956	(2001) Retroreflective Sheeting for Traffic Control

FEDERAL HIGHWAY ADMINISTRATION

MUTCD	(2000) Manual on Uniform Traffic Control Devices
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1.2 SUBMITTALS (NOT USED)

1.3 GENERAL

All sign faces shall conform to MUTCD.

PART 2 PRODUCTS

2.1 SIGN POSTS

2.1.1 Steel Flanged Channel Section (U-Shape)

Steel posts shall be fabricated from steel conforming to ASTM A 36/A 36M and shall have a minimum yield strength of 207 MPa and a minimum tensile strength of 345 MPa. Steel posts shall have 7.9 to 9.5 mm diameter holes spaced at 25.4 or 50.8 mm centers punched or drilled along the centerline of the web prior to galvanizing for the entire length of the post. Posts shall be galvanized in accordance with ASTM A 123/A 123M.

2.2 ALUMINUM SIGN PANELS



Aluminum sign panels shall conform to ASTM B 209M, alloy no.-temper 6061-T6 or 5052-H38. The blanks shall be free from laminations, blisters, open seams, pits, holes, other defects that may affect their appearance or use. The thickness shall be uniform and the blank commercially flat.

## 2.3 RETROREFLECTIVE SHEETING

Retroreflective sheeting shall conform to ASTM D 4956, Type I, II, III, IV, V, or VI. Type I retroreflective sheeting shall conform to ASTM D 4956, except the minimum coefficients of retroreflection for brown type I sheeting shown in Table I of ASTM D 4956 are amended as follows: 2.0 cd/lx/m<sup>2</sup> at 0.2 degrees observation angle and -4 degrees entrance angle, 1.0 cd/lx/m<sup>2</sup> at 0.2 degrees observation angle and +30 degrees entrance angle and at 0.5 degrees observation angle and -4 degrees entrance angle, and 0.5 cd/lx/m<sup>2</sup> at 0.5 degrees observation angle and +30 degrees entrance angle. All retroreflective sheeting shall have a precoated adhesive which will permanently adhere to the sign panel surface.

## 2.4 HARDWARE

Bolts, nuts and metal washers shall be either aluminum alloy or commercial quality steel, hot-dip galvanized or cadmium plated after fabrication. Fiber washers shall be of commercial quality.

## PART 3 EXECUTION

### 3.1 GENERAL

Insulating material shall be placed to prevent contact between aluminum and steel material.

### 3.2 SIGN POSTS

Steel sign posts shall either be driven with a suitable driving head or set in drilled or punched holes. Any posts damaged during driving or otherwise shall be replaced at no additional cost to the Government. [Sign posts shall be painted in accordance with Section 09900 PAINTING, GENERAL. Color shall be as indicated in Section 09915 COLOR SCHEDULE.]

### 3.3 SIGN PANELS

Clean, degrease and etch the face of metal panels using methods recommended by the retroreflective sheeting manufacturer. After cleaning and degreasing, retroreflective sheeting material shall be applied to the sign panels as recommended by the manufacturer. Shearing, cutting and punching shall be performed prior to preparing the blanks for application of reflective material. Holes shall not be field drilled in any part of the panel. [The back side of all sign panels shall be stamped with the month and year that the sign was manufactured. The date shall be located on the lower right side of the back of the sign panel and shall be approximately 6.4 mm high. The date shall be stamped into the sign panel material for a permanent record.] [The backs of sign panels shall be painted in accordance with Section 09900 PAINTING, GENERAL. Color shall be as indicated in Section 09915 COLOR SCHEDULE.] Any damaged sign panels shall be replaced at no additional cost to the Government.

### 3.4 LETTERS, NUMERALS, ARROWS, SYMBOLS, AND BORDERS

Letters, numerals, arrows, symbols, and borders shall be applied on the

retroreflective sheeting or opaque background of the sign using the direct or reverse screen process. Messages and borders of a color darker than the background shall be applied to the paint or the retroreflective sheeting using the direct process. Messages and borders shall be of a color lighter than the sign background and shall be applied using the reverse screen process. Opaque or transparent colors, inks, and paints of the type and quality recommended by the retroreflective sheeting manufacturer shall be used in the screen process. The screening shall be performed in a manner that results in a uniform color and tone, with sharply defined edges of legends and borders and without blemishes on the sign background that will affect intended use. The signs shall be air dried or baked after screening according to the manufacturer's recommendations to provide a smooth hard finish. Any signs with blister's or other blemishes shall be rejected.

### 3.5 LOCATION AND POSITION OF SIGNS

All signs shall be located and erected in accordance with the drawings and MUTCD. Unless otherwise shown, signs shall be erected with the sign faces and posts vertical. To reduce specular glare (mirror reflection), sign panels shall be turned 3 degrees away from the road in the direction of travel. The Contracting Officer's Representative shall inspect all signs for specular reflection at night after installation has been completed. If specular reflection is apparent on any sign, it shall be adjusted by the Contractor at his expense to eliminate or minimize specular reflection to the satisfaction of the Contracting Officer's Representative.

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SECTION 02560

(COLORADO) PAVEMENTS FOR SMALL PROJECTS  
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PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

STATE DEPARTMENT OF HIGHWAYS, DIVISION OF HIGHWAYS, STATE OF  
COLORADO (CDOT)

CDOT Standard Specifications for Road and  
Bridge Construction, 1999 Edition

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS  
(AASHTO)

AASHTO T 180 (1993) Moisture-Density Relations of Soils  
Using a 4.54-kg (10-lb) Rammer and an 457  
mm (18-in) Drop

AASHTO T 193 (1993) The California Bearing Ratio

AASHTO TP53 (1995) Determining Asphalt Content of Hot  
Mix Asphalt by the Ignition Method

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 185 (1994) Steel Welded Wire Fabric, Plain,  
for Concrete Reinforcement

ASTM C 31/C 31M (1996) Making and Curing Concrete Test  
Specimens in the Field

ASTM C 39 (1996) Compressive Strength of Cylindrical  
Concrete Specimens

ASTM C 88 (1998) Soundness of Aggregates by Use of  
Sodium Sulfate or Magnesium Sulfate

ASTM C 136 (1996a) Sieve Analysis of Fine and Coarse  
Aggregates

ASTM C 143 (1990a) Slump of Hydraulic Cement Concrete

ASTM C 150 (1998) Portland Cement

ASTM C 192/C 192M (1995) Making and Curing Concrete Test  
Specimens in the Laboratory

ASTM C 231 (1997) Air Content of Freshly Mixed

Concrete by the Pressure Method

ASTM C 566	(1997) Total Evaporable Moisture Content of Aggregate by Drying
ASTM C 881	(1990) Epoxy-Resin-Base Bonding Systems for Concrete
ASTM D 946	(1982; R 1993) Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D 1461	(1985; R 1994) Moisture or Volatile Distillates in Bituminous Paving Mixtures
ASTM D 1557	(1991; R 1998) Laboratory Compaction Characteristics of Soils Using Modified Effort (56,000 ft-lbf/ft (2,700 kN-m/m))
ASTM D 2041	(1995) Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D 2172	(1995) Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D 2726	(1996a) Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixture
ASTM D 2950	(1991; R 1997) Density of Bituminous Concrete in Place by Nuclear Method
ASTM D 3203	Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D 3405	(1996) Joint Sealants, Hot-Applied, for Concrete and Asphalt Pavements
ASTM D 3666	(1996a) Minimum Requirements for Agencies Testing and Inspecting Bituminous Paving Materials
ASTM D 4125	(1994) Asphalt Content of Bituminous Mixtures by the Nuclear Method
ASTM D 4867/D 4867M	(1996) Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D 5444	(1994) Mechanical Size Analysis of Extracted Aggregate
ASTM D 5893	(1996) Cold Applied, Single Component Chemically Curing Silicon Joint Sealant for Portland Cement Concrete Pavement
ASTM D 6307	(1998) Asphalt Content of Hot Mix Asphalt by Ignition Method

CRD-C 525 (1989) Corps of Engineers Test Method for  
Evaluation of Hot-Applied Joint Sealants  
for Bubbling Due to Heating

ASPHALT INSTITUTE (AI)

AI MS-2 (1994) Mix Design Methods for Asphalt  
Concrete and Other Hot-Mix Types

## 1.2 MEASUREMENT AND PAYMENT

Section "MEASUREMENTS AND PAYMENT" of the CDOT shall not apply.

## 1.3 MODIFICATION TO THE CDOT

Reference to "Engineer" and "Department" in the CDOT shall mean the  
Contracting Officer or Representative.

## 1.4 DEFINITIONS

For the purposes of this specification, the following definitions apply.

### 1.4.1 Degree of Compaction

Degree of compaction of [aggregate base course,] [rigid pavement base  
course,] [subbase course,] [and aggregate surface course] shall be  
expressed as a percentage of the maximum density obtained by the test  
procedure presented in either ASTM D 1557 or AASHTO T 180, Method D. The  
maximum density shall be determined in accordance with ASTM D 1557 if the  
material gradation contains less than 30 percent retained on the 19 mm  
sieve or AASHTO T 180 if the material gradation contains more than 30  
percent retained on the 19 mm sieve. In this specification, degree of  
compaction shall be a percentage of laboratory maximum density.

## 1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation;  
submittals not having a "G" designation are for information only. When  
used, a designation following the "G" designation identifies the office  
that will review the submittal for the Government. The following shall be  
submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Plant, Equipment, and Tools

Job Mix Formula; G-A.

Proposed JMF.

Mixture Proportions; G-A.

The report of the Contractor's mixture proportioning studies showing the  
proportions of all ingredients and supporting information on aggregate and  
other materials that will be used in the manufacture of concrete, at least  
14 days prior to commencing concrete placing operations.

SD-06 Test Reports

Initial Tests; G-A.

Certified copies of test results for approval not less than 20 days before material is required for the work.

Contractor Quality Control; G-A.

The Contractor shall submit all QC test results to the Contracting Officer on a daily basis as the tests are performed.

Acceptability of Work; G-A.

The Contractor shall submit all test results to the Contracting Officer on a daily basis as the tests are performed.

SD-07 Certificates

Asphalt Cement Binder; G-A.

Copies of certified test data.

Bituminous Tack and Prime Coat; G-A.

Copies of certified test data.

SD-08 Manufacturer's Instructions

Manufacturer's Recommendations; G-A

Where installation procedures, or any part thereof, are required to be in accordance with the manufacturer's recommendations, printed copies of these recommendations, 20 days prior to use on the project. Installation of the material will not be allowed until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.

1.6 SAMPLING AND TESTING

Sampling and testing shall be the responsibility of the Contractor. Sampling and testing shall be performed by a testing laboratory approved in accordance with Section 01451 CONTRACTOR QUALITY CONTROL. Work requiring testing will not be permitted until the testing laboratory has been inspected and approved. The materials shall be tested to establish compliance with the specified requirements; testing shall be performed at the specified frequency. The Contracting Officer may specify the time and location of the tests.

1.7 APPROVAL OF MATERIAL

The source of the material for aggregate base course, subbase course, rigid pavement base course, and aggregate surface course shall be selected 30 days prior to the time the material will be required in the work. Tentative approval of material will be based on initial test results. Final approval of the materials will be based on sieve analysis, liquid limit, and plasticity index tests performed on samples taken from the completed and fully compacted base and subbase course.

1.8 WEATHER LIMITATIONS



### 1.8.1 Hot-Mix Asphalt Pavement

The hot-mix asphalt pavement shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 1. The temperature requirements may be waived by the Contracting Officer, if requested; however, all other requirements, including compaction, shall be met.

Table 1. Surface Temperature Limitations of Underlying Course

<u>Mat Thickness, mm</u>	<u>Degrees C</u>
75 or greater	4
Less than 75	7

### 1.8.2 Bituminous Prime and Tack Coat

Bituminous coat shall be applied only when the surface to receive the bituminous coat is dry. Bituminous coat shall be applied only when the atmospheric temperature in the shade is 10 degrees C or above and when the temperature has not been below 2 degrees C for the 12 hours prior to application.

### 1.8.3 Portland Cement Concrete Pavement

Limitations on the placing of concrete shall conform to Section 412.09, "Limitations of Placing Concrete" of the CDOT.

### 1.8.4 Base Course, Subbase Course, Aggregate Surface Course

Construction of aggregate base course, subbase course, rigid pavement base course, and aggregate surface course shall be done when the atmospheric temperature is above 2 degrees C. When the temperature falls below 2 degrees C, the Contractor shall protect all completed areas by approved methods against detrimental effects of freezing. Completed areas damaged by freezing, rainfall, or other weather conditions shall be corrected to meet specified requirements.

## 1.9 PLANT, EQUIPMENT, AND TOOLS

All plant, equipment, and tools used in the performance of the work shall be subject to approval before the work is started and shall be maintained in satisfactory working condition at all times. The equipment shall be adequate and shall have the capability of producing pavements meeting the requirements as set forth herein.

## PART 2 PRODUCTS

### 2.1 HOT-MIX ASPHALT PAVEMENT

Bituminous wearing course shall conform to the requirements specified in the CDOT, Section 401, "PLANT MIX PAVEMENTS- GENERAL, and Section 403, "HOT BITUMINOUS PAVEMENT", except as modified herein. The aggregate shall be Grading [S] [SX]. Coarse aggregate shall meet the following additional requirements: Percentage of loss shall not exceed 18 after 5 cycles when performed in accordance with ASTM C 88, using magnesium sulfate. The

Contractor shall develop the mix design. The laboratory used to develop the job mix formula (JMF) shall meet the requirements of ASTM D 3666. A certification signed by the manager of the laboratory stating that it meets these requirements or clearly listing all deficiencies shall be submitted to the Contracting Officer prior to the start of construction. The asphalt mix shall be dense-graded and composed of a mixture of well-graded aggregate, mineral filler if required, and asphalt material. The hot-mix asphalt shall be designed using Marshall method of mix design contained in AI MS-2 and the criteria shown in Table 3. If the Tensile Strength Ratio (TSR) of the composite mixture, as determined by ASTM D 4867/D 4867M is less than 75, the aggregates shall be rejected or the asphalt mixture treated with an approved anti-stripping agent. The amount of anti-stripping agent added shall be sufficient to produce a TSR of not less than 75. If an antistrip agent is required, it shall be provided by the Contractor at no additional cost. The hot-mix asphalt pavement shall not contain more than 15 percent reclaimed asphalt pavement.

#### 2.1.1.1 JMF Requirements

The job mix formula shall be submitted in writing by the Contractor for approval at least 14 days prior to the start of the test section and shall include as a minimum:

- a. Percent passing each sieve size.
- b. Percent of asphalt cement.
- c. Percent of each aggregate and mineral filler to be used.
- d. Asphalt viscosity grade or performance grade.
- e. Number of blows of hammer per side of molded specimen.
- f. Laboratory mixing temperature.
- g. Lab compaction temperature.
- h. Temperature-viscosity relationship of the asphalt cement.
- i. Plot of the combined gradation on the 0.45 power gradation chart, stating the nominal maximum size.
- j. Graphical plots of stability, flow, air voids, voids in the mineral aggregate, and unit weight versus asphalt content as shown in AI MS-2.
- k. Specific gravity and absorption of each aggregate.
- l. Percent natural sand.
- m. Percent particles with 2 or more fractured faces (in coarse aggregate).
- n. Fine aggregate angularity.
- o. Percent flat or elongated particles (in coarse aggregate).
- p. Tensile Strength Ratio (TSR).

- q. Antistrip agent (if required) and amount.
- r. List of all modifiers and amount.
- s. Percentage and properties (asphalt content, binder properties, and aggregate properties) of reclaimed asphalt pavement (RAP) if RAP is used.

Table 2. Marshall Design Criteria

<u>Test Property</u>	<u>75 Blow Mix</u>	<u>50 Blow Mix</u>
Stability, newtons minimum	*8000	*4450
Flow, 0.25 mm	8-16	8-18
Air voids, percent	3-5	3-5
Percent Voids in mineral aggregate (VMA), (minimum)		
Grading S	13.0	13.0
Grading SX	14.0	14.0
TSR, minimum percent	75	75

\* This is a minimum requirement. The average during construction shall be significantly higher than this number to ensure compliance with the specifications.

\*\* Calculate VMA in accordance with AI MS-2, based on ASTM D 2726 bulk specific gravity for the aggregate.

#### 2.1.2 Adjustments to Field JMF

The Laboratory JMF for each mixture shall be in effect until a new formula is approved in writing by the Contracting Officer. Should a change in sources of any materials be made, a new laboratory jmf design shall be performed and a new JMF approved before the new material is used.

#### 2.1.3 Asphalt Cement Binder

Asphalt cement shall conform to the requirements specified in Section 702, "Bituminous Materials" of the CDOT. Asphalt cement binder shall be either viscosity grade AC-10 or Performance Grade (PG) 58-28 or ASTM D 946 penetration grade 85-100. Test data indicating grade certification shall be provided by the supplier at the time of delivery of each load to the mix plant. Copies of these certifications shall be submitted to the Contracting Officer. The supplier is defined as the last source of any modification to the binder.

#### 2.2 BITUMINOUS TACK AND PRIME COAT

Test data indicating grade certification shall be provided by the supplier. Copies of these certifications shall be submitted to the Contracting Officer.

##### 2.2.1 Bituminous Prime Coat

Bituminous prime coat shall conform to the requirements specified in Section 407, "Prime Coat, Tack Coat, and Rejuvenating Agent", and Section 702, "BITUMINOUS MATERIALS", of the CDOT. Bituminous materials shall be liquid asphalt, designation MC-30, or MC-70 at the Contractor's option, except that only MC-30 shall be used on dense graded base courses if MC-70 does not adequately penetrate the base course material. In lieu of cut-back asphalt, the Contractor may use cationic emulsified asphalt, designation CSS-1 or CSS-1h.

#### 2.2.2 Bituminous Tack Coat

Bituminous tack coat shall conform to the requirements specified in Section 407, "Prime Coat, Tack Coat, and Rejuvenating Agent" of the CDOT. Bituminous material shall be emulsified asphalt designation SS-1 or SS-1h, or cationic emulsified asphalt designation CSS-1 or CSS-1h.

### 2.3 PORTLAND CEMENT CONCRETE PAVEMENT

#### 2.3.1 Portland Cement Concrete

Portland cement concrete shall conform to the requirements specified in Section 412, "Portland Cement Concrete Pavement", and Section 601 "Structural Concrete" of the CDOT. Proportioning [and required 28-day field compressive strength] of the mix shall conform to the requirements of Class "P" concrete[, except that the required 28-day field compressive strength shall be [35 MPa]. The coarse aggregate shall have a maximum nominal size of 38 mm. The maximum allowable slump of the concrete shall be 75 mm for pavement constructed with fixed forms. For slipformed pavement, the maximum allowable slump shall be 30 mm. The water-cement ratio shall not exceed 0.45. The air content of the concrete by volume shall be maintained by the Contractor at 6.0 percent plus or minus 1.0 percent. The Contractor shall submit design mixture proportions, laboratory trial mix, aggregate data, and 28-day compressive strength test results in accordance with Section 601.05, "Proportioning" of the CDOT.

#### 2.3.2 Welded Steel Wire Fabric

Welded steel wire fabric shall conform to ASTM A 185.

#### 2.3.3 Dowels Bars and Tie Bars

Dowel bars and tie bars shall conform to Section 709.03 "Dowel Bars and Tie Bars" of the CDOT.

#### 2.3.4 Epoxy Resin

Epoxy resin materials for embedding dowels shall be two-component materials conforming to the requirements of ASTM C 881, Type IV, Grade 3. Class shall be appropriate for each application temperature to be encountered.

### 2.4 CONCRETE SIDEWALK AND CURB AND GUTTER

#### 2.4.1 General

Portland cement concrete shall conform to Section 601, "STRUCTURAL CONCRETE", of the CDOT, except as modified herein. Concrete shall be Class B or D. Coarse aggregate shall meet Number 57 or 67 gradation. The portland cement shall be Type I or II, and meet the optional chemical

requirements for low alkali when tested in accordance with ASTM C 150.

#### 2.4.2 Sidewalks

Portland cement concrete sidewalk shall conform to the requirements as specified in Section 608, "SIDEWALKS AND BIKEWAYS" of the CDOT.

#### 2.4.3 Curb and Gutter

Portland cement concrete curb and gutter shall conform to the requirements as specified in Section 609, "CURB AND GUTTER", of the CDOT.

#### 2.5 CURING MATERIALS

Curing materials for portland cement concrete pavement and sidewalk shall conform to Section 711.01 "Curing Materials" of the CDOT. Liquid membrane-forming compound shall be white pigmented type 2.

#### 2.6 JOINT FILLER, BACKER ROD AND SEALANT

Preformed expansion joint filler and backer rod shall conform to Section 705.01, "Joint Fillers" of the CDOT. Cold-applied silicone joint sealant shall conform to ASTM D 5893. Cold-applied silicone sealant for sidewalks shall be gray or stone in color. Hot-applied joint sealant shall conform to ASTM D 3405 and CRD-C 525.

#### 2.7 AGGREGATE BASE COURSE (ABC)

Aggregate base course aggregate shall conform to the requirements specified in Section 304, "AGGREGATE BASE COURSE" and Section 703.03 "AGGREGATE FOR BASES", of the CDOT, except as modified herein. Aggregate base course shall be CDOT Class 4 except as otherwise specified herein. The portion retained on the 4.75 mm sieve shall be known as coarse aggregate; that portion passing the 4.75 mm sieve shall be known as fine aggregate. Aggregates shall be angular particles of uniform density. Coarse aggregate shall be crushed gravel, crushed stone, crushed recycled concrete, or crushed slag. Fine aggregate shall consist of screenings, angular sand, crushed recycled concrete fines, or other finely divided mineral matter processed or naturally combined with the coarse aggregate. The amount of flat and elongated particles shall not exceed 30 percent. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3. In the portion retained on each sieve specified, the crushed aggregates shall contain at least 50 percent by weight of crushed pieces having two or more freshly fractured faces with the area of each face being at least equal to 75 percent of the smallest midsectional area of the piece. When two fractures are contiguous, the angle between planes of the fractures must be at least 30 degrees in order to count as two fractured faces. Crushed gravel shall be manufactured from gravel particles 50 percent of which, by weight, are retained on the maximum size sieve. The percentage of loss shall not exceed 18 after 5 cycles when performed in accordance with ASTM C 88, using magnesium sulfate. The portion of the material passing the 0.425 mm sieve shall have liquid limit not greater than 25 and a plasticity index not greater than 5. When tested for gradation, the percentage passing the 0.075 mm sieve shall not exceed 10 percent and the 0.02 mm sieve shall not exceed 3.0 percent.

#### 2.8 RIGID PAVEMENT BASE COURSE

Rigid pavement base course aggregate shall conform to the requirements specified in Section 304, "AGGREGATE BASE COURSE" and Section 703.03 "AGGREGATE FOR BASES", of the CDOT, except as modified herein. Rigid pavement base course shall be CDOT Class 5 except as otherwise specified herein. The aggregate shall meet the following additional properties; the aggregate shall be a crushed quarry rock, [crushed gravel, crushed screenings, sand or a combination thereof]. The percentage of loss shall not exceed 18 after 5 cycles when performed in accordance with ASTM C 88, using magnesium sulfate. The portion of the material passing the 0.425 mm sieve shall have liquid limit not greater than 25 and a plasticity index not greater than 5. When tested for gradation, the percentage passing the 0.075 mm sieve shall be between 9 percent and 15 percent. The 0.02 mm sieve shall not exceed 6.0 percent.

## 2.9 SUBBASE COURSE

Subbase course aggregate shall conform to the requirements specified in Section 304, "AGGREGATE BASE COURSE" and Section 703.03 "AGGREGATE FOR BASES", of the CDOT, except as modified herein. Subbase courses shall be CDOT Class 5 except as otherwise specified herein. The aggregate shall meet the following additional properties; the aggregate shall be a crushed quarry rock, [crushed gravel, crushed screenings, sand or a combination thereof]. The subbase course shall have a minimum California Bearing Ratio (CBR) of 50. The CBR shall be determined in accordance with AASHTO T 193. The percentage of loss shall not exceed 18 after 5 cycles when performed in accordance with ASTM C 88, using magnesium sulfate. The portion of the material passing the 0.425 mm sieve shall have liquid limit not greater than 25 and a plasticity index not greater than 5. When tested for gradation, the percentage passing the 0.075 mm sieve shall be between 9 percent and 15 percent. The 0.02 mm sieve shall not exceed 6.0 percent.

## 2.10 AGGREGATE SURFACE COURSE

Crushed aggregate surface course aggregate shall conform to the requirements specified in Section 304, "AGGREGATE BASE COURSE" and Section 703.03 "AGGREGATE FOR BASES", of the CDOT, except as modified herein. Aggregates shall consist of crushed stone or slag, crushed or natural gravel, sand, or other sound, durable materials processed and blended or naturally combined. Aggregates shall be durable and sound, free from lumps and balls of clay, organic matter, objectionable coatings, and other foreign material. The aggregate shall meet the gradation requirement for Class 7. The amount of flat and elongated particles shall not exceed 20 percent. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3. The aggregate for the surface course shall contain a minimum 80 percent crushed material. The portion of the material passing the 0.425 mm shall have a liquid limit not greater than 35 and a plasticity index of 4 to 9.

## 2.11 INITIAL TESTS

One of each of the following tests shall be performed on the proposed aggregate base course, rigid pavement base course, subbase course and aggregate surface course material prior to commencing construction to demonstrate that the proposed material meets all specified requirements when furnished. If materials from more than one source are going to be utilized, this testing shall be completed for each source.

- a. Sieve Analysis including 0.02 mm size material.

- b. Liquid limit and plasticity index moisture-density relationship.
- c. Moisture-density relationship.
- d. Wear.
- e. Soundness.

### PART 3 EXECUTION

#### 3.1 PAVEMENT REMOVAL

Where p.c. concrete and bituminous pavement is to be removed [at the locations shown on the drawings], the pavement shall be sawed with a pre-approved concrete saw so as to leave a straight true edge. P.C. concrete pavement removal shall be accomplished by a full depth double sawcut. The initial sawcut shall be located in the pavement area to be removed and shall be 450 mm from the final sawcut. The pavement material [and existing base course] shall be removed in a manner that will not damage the adjacent in-place pavement to remain [and as shown on the drawings]. The Contractor must demonstrate that his method of removal will not damage adjacent concrete pavement slabs. Any slab found by the Contracting Officer to be damaged by the Contractor's removal methods shall be fully removed and replaced at no cost to the Government. Pavement material from the removal area shall be disposed of [outside the limits of Government controlled land at the Contractor's expense] [at the disposal area indicated on the drawings].

#### 3.2 HOT-MIX ASPHALT PAVEMENT

Hot-mix asphalt pavement wearing course shall be constructed to the requirements specified in the CDOT, Section 401, "PLANT MIX PAVEMENTS-GENERAL" and Section 403, "HOT BITUMINOUS PAVEMENT", except as modified herein.

##### 3.2.1 Contractor Quality Control

A standard lot for all requirements will be equal to 8 hours of production.

##### 3.2.1.1 Asphalt Content

A minimum of two tests to determine asphalt content will be performed per lot by one of the following methods: the extraction method in accordance with ASTM D 2172, Method A or B, the ignition method in accordance with the AASHTO TP53 or ASTM D 6307, or the nuclear method in accordance with ASTM D 4125, provided the nuclear gauge is calibrated for the specific mix being used. For the extraction method, the weight of ash, as described in ASTM D 2172, shall be determined as part of the first extraction test performed at the beginning of plant production; and as part of every tenth extraction test performed thereafter, for the duration of plant production. The last weight of ash value obtained shall be used in the calculation of the asphalt content for the mixture.

##### 3.2.1.2 Gradation

Aggregate gradations shall be determined a minimum of twice per lot from mechanical analysis of recovered aggregate in accordance with ASTM D 5444. When asphalt content is determined by the nuclear method, aggregate

gradation shall be determined from hot bin samples on batch plants, or from the cold feed on drum mix plants. For batch plants, aggregates shall be tested in accordance with ASTM C 136 using actual batch weights to determine the combined aggregate gradation of the mixture.

#### 3.2.1.3 Temperatures

Temperatures shall be checked at least four times per lot, at necessary locations, to determine the temperature at the dryer, the asphalt cement in the storage tank, the asphalt mixture at the plant, and the asphalt mixture at the job site.

#### 3.2.1.4 Aggregate Moisture

The moisture content of aggregate used for production shall be determined a minimum of once per lot in accordance with ASTM C 566.

#### 3.2.1.5 Moisture Content of Mixture

The moisture content of the mixture shall be determined at least once per lot in accordance with ASTM D 1461 or an approved alternate procedure.

#### 3.2.1.6 Laboratory Air Voids, Marshall Stability and Flow

Mixture samples shall be taken at least four times per lot and compacted into specimens, using [50] [75] blows per side with the Marshall hammer. After compaction, the laboratory air voids of each specimen shall be determined, as well as the Marshall stability and flow.

#### 3.2.2 Acceptability of Work

The pavement will be accepted on the basis of tests made by the the Contractor or its suppliers, as specified herein. The Government may, at its discretion, make check tests to validate the results of the Contractor's testing.

##### 3.2.2.1 Sampling Pavements

Samples of the finished pavement, shall be obtained by the Contractor. The location of the samples shall be as directed and the cores shall be at least 100 mm in diameter. The samples shall be tested by the Contractor to determine conformance to density. Specimens shall be tested in accordance with the requirements of ASTM D 2726. Three samples shall be taken and tested for each 680 metric tons or less of bituminous mixture placed each day. A minimum of one core shall be obtained from the longitudinal joint. The Contractor shall fill all cores holes with new material and shall meet the requirements as described herein.

##### 3.2.2.2 Laboratory Air Voids

Laboratory air voids will be calculated by determining the Marshall density of each laboratory compacted specimen using ASTM D 2726 and determining the theoretical maximum density of every other subplot sample using ASTM D 2041. Laboratory air void calculations for each subplot will use the latest theoretical maximum density values obtained, either for that subplot or the previous subplot. The mean absolute deviation of the four laboratory air void contents (one from each subplot) from the JMF air void content will be evaluated. The mean absolute deviation shall be less than 1.00. All laboratory air void tests will be completed and reported within 24 hours



after completion of construction of each lot.

#### 3.2.2.3 In-place Density

Density of the compacted mixture of the bituminous wearing course shall be between 97 and 100 percent (joint density 95 to 100 percent) of the maximum laboratory compacted density. The maximum laboratory compacted specimens shall be determined from the same mixture taken from the plant in accordance with ASTM D 2041. Densities of the in-place compacted mixture may be determined by the nuclear method in accordance with ASTM D 2950 for Contractor quality control purposes. In any event, the basis of acceptance for density shall be determined from the specific gravity method.

#### 3.2.2.4 Surface Smoothness

After the final rolling, but not later than 24 hours after placement, the surface of the pavement in each entire lot shall be tested by the Contractor in such a manner as to reveal all surface irregularities exceeding the tolerances specified below. If any pavement areas are ground, these areas shall be retested immediately after grinding. All testing shall be performed in the presence of the Contracting Officer. Detailed notes of the results of the testing shall be kept and a copy furnished to the Government immediately after each day's testing. The entire area of the pavement shall be tested in both a longitudinal and a transverse direction on parallel lines. The transverse lines shall be 8 m or less apart, as directed. The longitudinal lines shall be at the centerline of each paving lane for lines less than 6 m and at the third points for lanes 6 m or greater. Other areas having obvious deviations shall also be tested. Longitudinal testing lines shall be continuous across all joints. Where drawings show required deviations from a plane surface (crowns, drainage inlets, etc.), the surface shall be finished to meet the approval of the Contracting Officer. The straightedge shall be held in contact with the surface and moved ahead one-half the length of the straightedge for each successive measurement. The amount of surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between these two high points. The finished surfaces of the pavements shall have no abrupt change of 5 mm or more, and all pavements shall be within the tolerances specified in Table 3 when checked with an approved 3 m straightedge.

Table 3. Straightedge Surface Smoothness--Pavements

<u>Pavement Category</u>	<u>Direction of Testing</u>	<u>Tolerance, mm</u>
-----	-----	-----
All	Longitudinal	5
paved areas	Transverse	5

#### 3.3 BITUMINOUS TACK AND PRIME COAT

Except as otherwise specified herein, application of bituminous tack and prime coat shall be in accordance with Section 407, PRIME COAT, TACK COAT, AND REJUVENATING AGENT" of the CDOT. Following application of the bituminous material and prior to the application of the pavement, the bituminous coat shall be allowed to cure and to obtain evaporation of any volatiles or moisture.

### 3.3.1 Bituminous Tack Coat

Contact surfaces of previously constructed pavement, curbs, manholes, and other structures shall be sprayed with a thin coat of bituminous tack coat. Rate of application shall be not less than 0.20 liter nor more than 0.70 liter per square meter.

### 3.3.2 Bituminous Prime Coat

A prime coat will be required if it will be at least seven days before a the surfacing (Asphalt cement hot mix concrete) layer is constructed on the underlying (base course, etc) compacted material. The type of liquid asphalt and application rate will be as specified herein. The Contractor shall protect the underlying from any damage (water, traffic, etc.) until the surfacing is placed. If the Contractor places the surfacing within seven days, the choice of protection measures or actions to be taken is at the Contractor's option. Damage to the underlying material caused by lack of, or inadequate, protection shall be repaired (recompacted or replaced) by approved methods at no additional cost to the Government. If the Contractor options to use the prime coat, it shall be applied as soon as possible after consolidation of the underlying material. Rate of application shall be not less than 0.70 liters nor more than 1.80 liters per square meter. To obtain uniform application of the prime coat on the surface treated at the junction of previous and subsequent applications, building paper shall be spread on the surface for a sufficient distance back from the ends of each application to start and stop the prime coat on the paper. Immediately after application, the building paper shall be removed and destroyed. Prime coat shall be allowed to cure without being disturbed for a period of at least 48 hours or longer, as may be necessary to attain penetration into the treated course.

## 3.4 PORTLAND CEMENT CONCRETE PAVEMENT

Except as otherwise specified herein, portland cement concrete shall be constructed in accordance with the requirements specified in Section 412, "PORTLAND CEMENT CONCRETE PAVEMENT", and Section 601, "STRUCTURAL CONCRETE" of the CDOT. Tining and stationing of concrete is not required.

### 3.4.1 Spreading

Spreading shall be by machine or hand method. Hand spreading will be permitted only when approved for odd widths or shapes of slabs, or for placement of separate, isolated slabs during removal and replacement type repair operations, or for lanes 15 m or less in length. Hand spreading, where permitted, shall be done with shovels; rakes shall not be used. Where the concrete is delivered to the form in truck mixers, suitable chutes may be used, provided windrows cover essentially the entire area within the form. In no case shall dumping of concrete in piles be permitted.

### 3.4.2 Placing Reinforcing Steel

Reinforcement shall be positioned on suitable chairs securely fastened to the subgrade prior to concrete placement, or may be placed on an initial layer of consolidated concrete, with the subsequent layer placed within 30 minutes of the first layer placement.

### 3.4.3 Joints

Transverse and longitudinal contraction joints shall be of the weakened plane type and shall be formed by sawing. Joints shall be sealed with hot-applied or cold-applied sealant immediately following curing of the concrete or as soon thereafter as weather conditions permit. Before sealing operations commence, a copy of the Manufacturer's Recommendations pertaining to the storage, heating and application of the sealant shall be submitted to the Contracting Officer.

#### 3.4.4 Contractor Quality Control

The Contractor shall perform the inspection and tests described below at the placement and, based upon the results of these inspections and tests, shall take the action required and submit reports as specified. When, in the opinion of the Contracting Officer, the paving operation is out of control, concrete placement shall cease. The Contractor shall furnish all materials, labor, and facilities required for molding, curing, testing, and protecting test specimens at the site and in the laboratory.

##### 3.4.4.1 Air Content Testing

Air content tests shall be made when test specimens are fabricated. In addition, at least two other tests for air content shall be made on randomly selected batches of each separate concrete mixture produced during each 8-hour period of paving. All air content measurements shall be determined in accordance with ASTM C 231. Whenever air content reaches specified limits, an immediate confirmatory test shall be made. If the second test also shows air content at or exceeding specified limits, an adjustment shall immediately be made in the amount of air-entraining admixture batched to bring air content within specified limits. If the next adjusted batch of concrete is not within specified limits, concrete placement shall be halted until concrete air content is within specified limits.

##### 3.4.4.2 Slump Testing

Slump tests shall be made when test specimens are fabricated. Additional tests shall be made when excessive variation in workability is reported by the placing foreman or Government inspector. All slump tests shall be made in accordance with ASTM C 143. Whenever slump approaches the maximum limit, an adjustment shall immediately be made in the batch masses of water and fine aggregate. When a slump result exceeds the specification limit, no further concrete shall be delivered to the paving site until adjustments have been made and slump is again within the limit.

##### 3.4.4.3 Temperature

The temperature of the concrete shall be measured when strength specimens are fabricated.

##### 3.4.4.4 Concrete Strength Testing

Four (4) cylinders from the same batch shall be fabricated, cured and tested for compressive strength, testing two cylinders at 7-day and two cylinders at 28-day age. A strength test shall be the average of the strengths of two cylinders made from the same sample of concrete and tested at 28 days. A minimum of one set of four (4) cylinders shall be fabricated, cured and tested for each shift of concrete placement nor less than once for each 200 cubic meters of concrete or fraction thereof. All test cylinders shall be 150 by 300 mm cylinders and shall be fabricated in

accordance with ASTM C 192/C 192M, using only steel molds, cured in accordance with ASTM C 31/C 31M, and tested in accordance with ASTM C 39. Control charts for strength, showing the 7-day and 28-day CQC compressive strengths, and the 28-day required compressive strength, shall be maintained and submitted with weekly CQC Reports.

#### 3.4.5 Acceptability of Work

The pavement will be accepted on the basis of tests made by the Contractor or its suppliers, as specified herein. The Government may, at its discretion, make check tests to validate the results of the Contractor's testing.

##### 3.4.5.1 Strength Requirements

A strength test shall be the average of the strengths of two cylinders made from the same sample of concrete and tested at 28 days. The strength of the concrete will be considered satisfactory so long as the running average of all sets of three consecutive test results equals or exceeds the specified 28-day field compressive strength and no individual test result falls below the specified strength by more than 3.5 MPa. The Contractor shall furnish all materials, labor, and facilities required for molding, curing, testing, and protecting test specimens at the site and in the laboratory.

##### 3.4.5.2 Surface Smoothness Requirements

The surface of the pavement shall be tested with a 3 m (10 foot) straightedge to identify all surface irregularities exceeding the tolerances specified above. The entire area of the pavement shall be tested in both a longitudinal and a transverse direction on parallel lines approximately 4.5 m apart. The straightedge shall be held in contact with the surface and moved ahead one-half the length of the straightedge for each successive measurement. The amount of surface irregularity shall be determined by placing the straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length and measuring the maximum gap between the straightedge and the pavement surface, in the area between these two high points. The finished surfaces of the pavements shall have no abrupt change of 3 mm or more. All pavements shall have a surface smoothness tolerance within 6.5 mm in the transverse and longitudinal direction, except that roads and streets shall have tolerance of 5 mm in the longitudinal direction. In areas not meeting the specified limits for surface smoothness, high areas shall be reduced to attain the required smoothness, except as depth is limited below. High areas shall be reduced by grinding the hardened concrete with a surface grinding machine after the concrete is 14 days or more old. The depth of grinding shall not exceed 6 mm. All pavement areas requiring surface smoothness corrections in excess of the specified limits, shall be removed and replaced. All areas in which grinding has been performed will be subject to the thickness tolerances specified in paragraph Thickness. Any grinding performed on individual slabs with excessive deficiencies shall be performed at the Contractor's own decision without entitlement to additional compensation if eventual removal of the slab is required.

##### 3.4.5.3 Edge Slump Testing and Conformance

When slip-form paving is used, not more than 15 percent of the total free edge [of any 255 mm or thicker slab] of the slipformed portion of the pavement, shall have an edge slump exceeding 6 mm and no slab shall have an

edge slump exceeding 9 mm. Edge slump shall be determined as above for surface smoothness, at each free edge of each slipformed paving lane constructed. Measurements shall be made at 1.5 to 4.5 m spacings, and as directed. When edge slump exceeding the limits specified above is encountered on either side of the paving lane, additional straightedge measurements shall be made, if required, to define the linear limits of the excessive slump. The concrete for the entire width of the paving lane within these limits of excessive edge slump shall be removed and replaced. Adding concrete or paste to the edge or otherwise manipulating the plastic concrete after the sliding form has passed, or patching the hardened concrete, shall not be used as a method for correcting excessive edge slump.

#### 3.4.5.4 Thickness Determination

The thickness of the pavement shall be determined by the Government on the basis of measurements made on 100 mm diameter cores which shall be drilled by the Contractor, within 7 days after placement of the concrete. Cores shall be drilled at the points directed by the Contracting Officer and there shall be at least one core taken from each separate pavement areas of 3300 sq m or less. The Contractor shall fill the core holes with an approved non-shrink high strength grout. [For pavements less than 200 mm in thickness, when any core shows a deficiency in thickness greater than 6 mm, the pavement area represented by the core shall be removed and replaced by the Contractor at no cost to the Government.] [For pavements greater than 200 mm in thickness, when any core shows a deficiency in thickness greater than 13 mm, the pavement area represented by the core shall be removed and replaced by the Contractor at no cost to the Government.]

### 3.5 CONCRETE SIDEWALK AND CURB AND GUTTER

The subgrade shall be in a moist condition when concrete is placed. The subgrade shall be prepared and protected to produce a subgrade free from frost when the concrete is deposited. Forms shall be cleaned and coated with form oil each time before concrete is placed. Wood forms may, instead, be thoroughly wetted with water before concrete is placed, except that with probable freezing temperatures, oiling is mandatory.

#### 3.5.1 Sidewalks

Except as otherwise specified herein, portland cement concrete sidewalk shall be constructed in accordance with Section 608, "SIDEWALKS AND BIKEWAYS" of the CDOT. Subgrade shall be placed and compacted in conformance with [Section 02300 EARTHWORK] [Section 02210 GRADING]. The subgrade shall be tested for grade and cross section by means of a template extending the full width of the sidewalk and supported between side forms. Finished surfaces shall not vary more than 8 mm from the testing edge of a 3 m straightedge. Permissible deficiency in section thickness will be up to 6 mm. All slab edges, including those at formed joints, shall be finished with an edger having a radius of 3 mm. Transverse joint shall be edged before brooming, and the brooming shall eliminate the flat surface left by the surface face of the edger. Sidewalk joints shall be constructed to divide the surface into square or rectangular areas. Spacing of transverse and longitudinal contraction and expansion joints shall be as indicated. At the end of the curing period, expansion joints shall be carefully cleaned and filled with cold-applied joint sealant (gray or stone color) as indicated on the drawings. The joint opening shall be thoroughly cleaned before the sealing material is placed. Sealing material shall not be spilled on exposed surfaces of the concrete. Concrete at the joint shall be surface dry and the atmospheric and concrete temperatures

shall be above 10 degrees C at the time of application of joint sealing material.

### 3.5.2 Curb and Gutter

Except as otherwise specified herein, portland cement concrete curb and gutter shall be constructed in accordance with Section 609, "CURB AND GUTTER", of the CDOT. The subgrade shall be tested for grade and cross section by means of a template extending the full width of the curb and gutter. Concrete shall be placed to the section required in a single lift.

Consolidation shall be achieved by using approved mechanical vibrators. Curve shaped gutters shall be finished with a standard curb "mule".

Approved slipformed curb and gutter machines may be used in lieu of hand placement. Exposed surfaces shall be floated and finished with a smooth wood float until true to grade and section and uniform in texture. The edges of the gutter and top of the curb shall be rounded with an edging tool to a radius as shown on the drawings. Finished surfaces shall not vary more than 6 mm from the testing edge of a 3 m straightedge.

Permissible deficiency in section thickness will be up to 6 mm.

Contraction joints shall be spaced so that monolithic sections between curb returns will not be less than 1.5 m nor greater than 4.5 m in length.

Contraction joints shall be constructed by means of 3 mm thick separators and of a section conforming to the cross section of the curb and gutter. Separators shall be removed as soon as practicable after concrete has set sufficiently to preserve the width and shape of the joint and prior to finishing. Expansion joints shall be formed by means of preformed expansion joint filler material cut and shaped to the cross section of curb and gutter. Expansion joints at least 13 mm in width shall be provided at intervals not exceeding 12 meters. Expansion joints and the top 25 mm depth of contraction joints shall be sealed with cold or hot-applied sealant immediately following curing of the concrete or as soon thereafter as weather permits. The joint opening shall be thoroughly cleaned before the sealing material is placed. Sealing material shall not be spilled on exposed surfaces of the concrete. Concrete at the joint shall be surface dry and the atmospheric and concrete temperatures shall be above 10 degrees C at the time of application of joint sealing material. Excess material on exposed surfaces of the concrete shall be removed immediately and concrete surfaces cleaned.

### 3.5.3 Curing and Protection

Concrete shall be protected against loss of moisture and rapid temperature changes for at least 7 days from the beginning of the curing operation. Concrete shall be cured using one of the following methods

#### 3.5.3.1 Mat Method

The entire exposed surface shall be covered with 2 or more layers of burlap. Mats shall overlap each other at least 150 mm. The mat shall be thoroughly wetted with water prior to placing on concrete surface and shall be kept continuously in a saturated condition and in intimate contact with concrete for not less than 7 days.

#### 3.5.3.2 Impervious Sheeting Method

The entire exposed surface shall be wetted with a fine spray of water and then covered with impervious sheeting material. Sheets shall be laid directly on the concrete surface with the light-colored side up and overlapped 300 mm when a continuous sheet is not used. The curing medium

shall not be less than 450 mm wider than the concrete surface to be cured, and shall be securely weighted down by heavy wood planks, or a bank of moist earth placed along edges and laps in the sheets. Sheets shall be satisfactorily repaired or replaced if torn or otherwise damaged during curing. The curing medium shall remain on the concrete surface to be cured for not less than 7 days.

#### 3.5.3.3 Membrane Curing Method

A uniform coating of white-pigmented membrane-curing compound shall be applied to the entire exposed surface of the concrete as specified in Section 412.14, "Curing" of the CDOT.

### 3.6 AGGREGATE COURSES

Aggregate base course, subbase course, rigid pavement base course, and aggregate surface course shall conform to, and be constructed in accordance with, the requirements specified in Section 304, "AGGREGATE BASE COURSE" and Section 703.03, "AGGREGATE FOR BASES" of the CDOT, except as modified herein. The aggregate base course, subbase course, rigid pavement base course, and aggregate surface course shall be compacted to 100 percent of laboratory maximum density.

#### 3.6.1 Acceptability of Work

The aggregate base course, subbase course, rigid pavement base course, and aggregate surface course will be accepted on the basis of tests made by the Contractor as specified herein. The Government may, at its discretion, make check tests to validate the results of the Contractor's testing.

##### 3.6.1.1 In-Place Tests

One of each of the following tests shall be performed on samples taken from the placed and compacted aggregate course. Samples shall be taken and tested at the rates indicated for each layer of material placed.

a. Density tests shall be performed on every lift of material placed and at a frequency of one set of tests for every 250 square meters, or portion thereof, of completed area.

b. Sieve Analysis [including 0.02 mm size material] shall be performed on every lift of material placed and at a frequency of one test for every 1000 square meters, or portion thereof, of completed area for every 500 metric tons, or portion thereof, of material placed.

c. Liquid limit and plasticity index tests shall be performed at the same frequency as the sieve analysis.

##### 3.6.1.2 Thickness

The total compacted thickness of the aggregate course shall be within 13 mm of the thickness indicated. Where the measured thickness is more than 13 mm deficient, such areas shall be corrected by scarifying, adding new material of proper gradation, reblading, and recompacting as directed. Where the measured thickness is more than 13 mm thicker than indicated, the course shall be considered as conforming to the specified thickness requirements. Average job thickness shall be the average of all thickness measurements taken for the job, but shall be within 6 mm of the thickness indicated. The total thickness of the aggregate course shall be measured

at intervals in such a manner as to ensure one measurement for each 500 square meters of aggregate course. Measurements shall be made in 75 mm diameter test holes penetrating the aggregate course.

#### 3.6.1.3 Smoothness

The surface of the top layer shall show no deviations in excess of 10 mm when tested with a 3 meter straightedge applied parallel with and at right angles to the centerline of the area to be paved. Measurements shall be taken in successive positions parallel to the centerline of the area to be paved. Measurements shall also be taken perpendicular to the centerline at 15 meter intervals. Deviations exceeding this amount shall be corrected by removing material and replacing with new material, or by reworking existing material and compacting it to meet these specifications.

-- End of Section --



# **PART C**

## **Government Edited Technical Guide Specifications**

Part C addresses government edited guide specifications (Technical) required to be placed in the 100% Design package. These specifications are fully edited and ready for use in the design. The Contractor will comply, supply and furnish all requirements in accordance with the specifications listed below. Note: for a listing of government edited guides (Administrative) see Section 01332: SUBMITTALS DURING DESIGN

### **SECTION 15951A - DIRECT DIGITAL CONTROL (DDC) SYSTEM**

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SECTION 15951A

DIRECT DIGITAL CONTROL (DDC) SYSTEM

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SECTION 15979

DIRECT DIGITAL CONTROL (DDC) SYSTEM

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PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AIR MOVEMENT AND CONTROL ASSOCIATION (AMCA)

\-AMCA 500-\ (1994) Test Methods for Louvers, Dampers and Shutters

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

\-ANSI C2-\ (1997) National Electrical Safety Code

AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR CONDITIONING ENGINEERS (ASHRAE)

\-ASHRAE-03-\ (1993) Fundamentals Handbook "Chapter "Measurement and Instruments""

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

\-ASME B40.1-\ (1991) Gauges - Pressure Indicating Dial Type - Elastic Element

\-ASME PTC 19.3-\ (1974; R 1986) Instruments and Apparatus: Part 3 Temperature Measurement

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

\-IEEE C62.41-\ (1991) Surge Voltages in Low-Voltage AC Power Circuits

\-IEEE Std 142-\ (1991) IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

\-NEMA 250-\ (1991) Enclosures for Electrical Equipment (1000 Volts Maximum)

\-NEMA ICS 1-\ (1993) Industrial Controls and Systems

\-NEMA ICS 6-\ (1983, Incl. Rev. 1) Enclosures for Industrial Controls and Systems

1.2 GENERAL REQUIREMENTS

The direct digital control (DDC) shall be a complete system suitable for the heating, ventilating and air-conditioning (HVAC) system and energy management and control system (EMCS) provided by Staefa Control System, Inc (SCS). Staefa Control System, Inc. is the only acceptable manufacturer for DDC Controllers, automatic control valves, damper and valve operators, temperature and velocity instruments and data communication equipment. All other materials and equipment may be furnished by other manufacturers but shall be specifically approved by (SCS) through the Contracting Officer for use on this project and for the intended application on this project. Notwithstanding Section 00700 Contract Clauses FAR 52.236-5, Material and Workmanship, DDC system shall be manufactured by Staefa Control System, Inc. in order that the DDC system is compatible with the existing EMCS. No other product will be acceptable. The Competition Advocate authorizes sole source procurement.

a. Standard Products

Material and equipment shall be the manufacturer's standard products which will be capable of communicating directly with the existing base EMCS system (Staefa) without the use of interface equipment, and each component shall provide the discrete functions indicated herein and on the drawings. Any deviation from indicated logic shall not be permitted. Items or equipment (individual control system components such as pressure and temperature sensors, transmitters and controllers) shall essentially duplicate equipment that has been in satisfactory use for at least two years prior to bid opening. Equipment shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site.

Combining of components or discrete component functions by using multiple function devices which have not been indicated in the original specifications and drawings will not be acceptable. Any deviation from indicated logic shall not be permitted.

One extra control sensor, sensing device and transducer for every ten sensors, sensing devices and transducers installed

b. Identical Items

Items of equipment that perform the same function shall be identical, including equipment, individual components, assemblies, and parts. Where an item of equipment is provided for a particular application, that item of equipment shall be used for every occurrence of that application throughout the project. Use of multiple items of equipment for different occurrences of the same application is not permitted.

c. Configuration

The contractor shall configure the Direct Digital Control (DDC) system as described herein and shown on the drawings. The DDC panels and DDC controllers shall be fully capable of controlling their respective systems. The (DDC panels) which shall be strategically located near high concentrations of data points and in proximity to the end devices monitored or controlled. All computing devices, as defined in CFR 47 Part 15, shall be certified to comply with the requirements for Class A computing devices and labeled as set forth in CFR 47 Part 15. The system shall provide for operator interaction through the local DDC panel's through the use of a portable operator device known as a Smart II/Tool. The use of DDC Controllers known as Smart II/VAV, Smart II/Fancoil, and Smart II/DDC shall be acceptable and encouraged where

applicable. This DDC panel(s), SN's, and DDC controllers shall manage all control functions which is in their data environment as specified and be fully capable of operating in a stand alone mode without reliance on data from the Base wide EMCS. The DDC panels and DDC controllers must be fully capable of operating in a stand alone mode without reliance on the EMCS. One Staefa Net Controller shall be provided in each building. Every connected analog output (AO), analog input (AI), binary output (BO), and binary input (BI), represents a data point where referred to in this specification.

d. Connection to Existing Base wide EMCS

Connection to existing Base EMCS system shall be part of this project.

e. Compatibility

The new field equipment (SN's, DDC controllers, sensors, devices, etc.) shall be capable of interface to and operate under control of the existing Basewide Staefa EMCS.

f. System Accuracy

The system shall maintain an end to end accuracy for one year from sensor to Operator's Console display for the applications specified.

1.2.1 Nameplates, Lens Caps, and Tags

Nameplates and lens caps bearing legends as shown and tags bearing device-unique identifiers as shown shall have engraved or stamped characters.

Nameplates shall be mechanically attached to Direct Digital Control (DDC) panel interior doors. A plastic or metal tag shall be mechanically attached directly to each device or attached by a metal chain or wire. Each airflow measurement station shall have a tag showing flow rate range for signal output range, duct size, and identifier as shown. Provide laminated plastic nameplates, where appropriate, for all monitoring and control devices furnished. Each nameplate shall identify the function, such as "mixed air controller" or "cold deck temperature sensor." Laminated plastic shall be 1/8-inch thick, black with white center core. Nameplates shall be a minimum of 1 inch by 3 inches, with minimum 3-inch high block lettering. Nameplates for devices smaller than 1 inch by 3 inches shall be attached by nonferrous metal chain.

1.2.2 Verification of Dimensions

The Contractor shall become familiar with all details of the work, shall verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing any work.

1.2.3 Drawings

Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. The Contractor shall investigate the mechanical, electrical, and finish conditions that could affect the work to be performed, shall arrange such work accordingly, and shall furnish all work necessary to meet such conditions.

1.2.4 Power-Line Surge Protection

Equipment connected to ac circuits shall be protected from power-line surges. Equipment protection shall meet the requirements of \-IEEE C62.41-\ . Fuses shall not be used for surge protection.

#### 1.2.5 Surge Protection for Transmitter and Control Wiring

DDC system control-panel equipment shall be protected against surges induced on control and transmitter wiring installed outside and as shown. The equipment protection shall be tested in the normal mode and in the common mode, using the following two waveforms:

- a. A 10 microsecond by 1,000 microsecond waveform with a peak voltage of 1,500 volts and a peak current of 60 amperes.
- b. An 8 microsecond by 20 microsecond waveform with a peak voltage of 1,000 volts and a peak current of 500 amperes.

#### 1.2.6 Power-Line Conditioners (PLC)

PLCs shall be furnished for each DDC panel. The PLCs shall provide both voltage regulation and noise rejection. The PLCs shall be of the ferro-resonant design, with no moving parts and no tap switching while electrically isolating the secondary from the power-line side. The PLCs shall be sized for 125 percent of the actual connected kVA load. Characteristics of the PLC shall be as follows:

- a. At 85 percent load, the output voltage shall not deviate by more than plus or minus 1 percent of nominal when the input voltage fluctuates between minus 20 percent to plus 10 percent of nominal.
- b. During load changes of zero to full load, the output voltage shall not deviate by more than plus or minus 3 percent of nominal. Full correction of load switching disturbances shall be accomplished within 5 cycles, and 95 percent correction shall be accomplished within two cycles of the onset of the disturbance.
- c. Total harmonic distortion shall not exceed 3-1/2 percent at full load.

#### 1.2.7 System Overall Reliability Requirement

The system shall be configured and installed to yield a mean time between failure (MTBF) of at least 40,000 hours. Each DDC panel shall be designed, configured, installed and programmed to provide for stand alone operation with minimal performance degradation on failure of other system components to which it is connected or with which it communicates.

#### 1.2.8 Multiple DDC Panel Requirement

DDC panels shall control equipment as indicated on HVAC control drawings. DDC panels shall be located where indicated. DDC panels shall not control equipment located in a different mechanical room. DDC panels shall be located in the same room as the equipment being controlled .

#### 1.2.9 System Accuracy and Display

The system shall maintain an end-to-end accuracy for 1 year from sensor to operator's console display for the applications specified and shall display the value as specified. Each temperature shall be displayed and printed to nearest 0.1 degree F.

#### 1.2.9.1 Space Temperature

Space temperature with a range of 32 to 86 degrees F. plus or minus 1.0 degree F. for conditioned space; 30 to 130 degrees F plus or minus 1 degree F for unconditioned space.

#### 1.2.9.2 Duct Temperature

Duct temperature with a range of 40 to 140 degrees F plus or minus 2 degrees F.

#### 1.2.9.3 Outside Air Temperature

Outside air (OA) temperature with a range of minus 30 to plus 130 degrees F plus or minus 2 degrees F; with a subrange of 30 to 100 degrees F plus or minus 1 degree F.

#### 1.2.9.4 Water Temperature

Water temperature with a range of 32 to 86 degrees F. plus or minus 1.0 degree F. ; the range of 100 to 250 degrees F plus or minus 2 degrees F.

#### 1.2.9.5 High Temperature

High temperature with a range of range of 200 to 500 degrees F. plus or minus 2.0 degrees F..

#### 1.2.9.6 Relative Humidity

Relative humidity with a range of 20 to 80 percent plus or minus 6.0 percent of range (display and print to nearest 1.0 percent).

#### 1.2.9.7 Pressure

Pressure with a range for the specific application plus or minus 2.0 percent of range (display and print to nearest psi.

#### 1.2.9.8 Flow

Flow with a range for the specific application plus or minus 3.0 percent of range, and flows for the purpose of thermal calculations to plus or minus 2.0 percent of actual flow (display and print to nearest unit, such as gallons per minute).

#### 1.2.9.9 NOT USED

#### 1.2.9.10 Analog Value Input

An analog value input to the system's equipment via an AI with a maximum error of 0.50 percent of range, not including the sensor or transmitter error. This accuracy shall be maintained over the specified environmental conditions.

#### 1.2.10 Environmental Conditions



The DDC controllers and SN's shall operate properly under ambient environmental conditions of 32 to 122 degrees F. dry bulb and 10 to 90 percent relative humidity, noncondensing. Sensors and control elements shall operate under the ambient environmental temperature, pressure, humidity, and vibration conditions specified or normally encountered for the installed location. Other equipment shall, unless designated otherwise, operate properly under ambient environmental conditions of 60 to 85 degrees F. and a relative humidity of 20 to 80 percent.

#### 1.2.11 Abbreviations, Symbols, and Definitions

All letter symbols and engineering unit abbreviations utilized in information displays and printouts shall conform to the \-ASHRAE-03-\.

#### 1.2.12 Not Used

### 1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section \=01330=\ SUBMITTAL PROCEDURES:

\\*SD-01 Data\*\

\\*Equipment Data\*\; \\*GA1\*\.

The equipment data shall be in booklet form, indexed to the unique identifiers, shall consist of data sheets that document compliance with the specification and shall include a copy of each HVAC control system bill of materials. Catalog cuts shall be in booklet form indexed by device type. Where multiple components are shown on a catalog cut, the application specific component shall be marked. Data shall include a list of qualified service organizations and their qualifications. Service organizations shall be reasonably convenient to the equipment on a regular and emergency basis, during the warranty period.

\\*System Descriptions and Analyses\*\; \\*GA1\*\.

System descriptions, analyses, and calculations used in required sizing equipment. Descriptions and calculations shall show how the equipment will operate as a system to meet the specified performance. The data package shall include the following:

- a. DDC panel memory size.
- b. DDC panel automatic start up operations.
- c. Database update procedure.
- d. DDC panel expansion capability and method of implementation.
- e. DDC panel operation.
- f. Database entry forms or data listings.

\\*Software\*\; \\*GA1\*\.

Descriptions of software.

\\*System Overall Reliability Calculations\*\; \\*GA1\*\.

Manufacturer's reliability data and calculations required to show compliance with the specified reliability. Instrumentation and controls shall not be included in the calculations.

\\*Training Data\*\; \\*GA\*\.

A training course in the maintenance and operation of the HVAC control systems, approved 60 days prior to the start of training. Lesson plans and training manuals for the training, including type of training to be provided, with a list of reference material. The training shall be oriented to the specific systems being installed. One training manual shall be furnished for each trainee, plus two additional copies for archivalable storage at the project site. The manuals shall include the agenda, the defined objectives for each lesson, and a detailed description of the subject matter for each lesson. Two copies of audiovisual materials shall be included, for archival storage at the project site, either as a part of the printed training manuals or on the same media as that to be used during the training session.

\\*Data Entry Forms\*\; \\*GA\*\.

The completed data entry forms or data summaries, if data entry is done through interactive computer interfacing, utilizing all data required by the contract documents and other pertinent information required for complete installation of the database. Additional data to provide a complete and operational control system shall be identified and requested from the Government. The proposed forms shall be provided at least 90 days prior to the Contractor's scheduled need date.

\\*BTU MONITORING SYSTEM EQUIPMENT\*\; \\*GA1\*\.

\\*BTU COMPUTER\*\; \\*GA1\*\.

\\*SD-04 Drawings\*\

\\*System Drawings\*\; \\*GA1\*\.

All system drawings required by this specification shall be submitted in a single, complete package, no later than sixty days after award of a contract.

Each control system element on a drawing shall have a unique identifier which shall contain the system number as shown. A series of drawings shall be provided for each control system. The system drawings shall consist of a complete list of equipment and materials, including manufacturer's descriptive and technical literature, performance charts and curves, catalog cuts, and installation points, routing, and schematic diagrams, software descriptions, minimum outside air and all other necessary calculations, and any other details required to demonstrate that the system has been coordinated and will properly function as a system. System drawings shall show proposed layout and installation of all equipment and appurtenances, and equipment relationship to other parts of the work. If this project is an addition to or a modification of the existing DDC control system, the system drawings shall detail how the new work interfaces to the existing system. All new work shall be shown using clouding or notes to differentiate from the existing system.

System drawings shall be 18 inches high by 24 inches wide containing the following:

- a. A drawing index.
- b. A list of symbols, abbreviations and identifiers.

All letter symbols and engineering unit abbreviations utilized in information displays, printouts, and submittals shall conform to the ASHRAE Handbook of Fundamentals.

c. A series of drawings for each HVAC control system using abbreviations, symbols, nomenclature and identifiers similar to those shown on the contract drawings. Each control-system element on a drawing shall have a unique identifier.

Each series of drawings for an HVAC control system shall include a schematic similar to those shown on the contract drawings, a wiring diagram, a list of equipment with manufacturer and model number, a DDC panel arrangement drawing and an HVAC control-system sequence of operation. The sequence of operation for each HVAC control system shall be in the language and format of this specification. No operational deviations from specified sequences will be permitted without prior written approval of the Contracting Officer. The sequence of operation shall refer to each device by its unique identifier.

The wiring diagram shall show the interconnection of wires and cables to DDC panel terminal blocks and to the identified terminals of starters and packaged equipment, with all necessary jumpers and ground connections. The wiring diagram shall show the labels of all conductors. All sources of power required for HVAC control systems and for packaged equipment control systems shall be identified back to the panelboard circuit breaker number, DDC panel, magnetic starter, or packaged control equipment circuit. Each power supply and transformer not integral to a starter or packaged equipment shall be shown. The connected volt-ampere load and the power supply volt-ampere rating shall be shown.

- d. A system block diagram.
- e. DDC panel installation, block diagrams, and wiring diagrams.
- f. DDC panel physical layout and schematics.
- g. Details of surge protection device installations.
- h. Valve schedules.

The valve schedule shall include each valve's unique identifier, size, flow coefficient (Cv), pressure drop at specified flow rate (see mechanical schedules), spring range, and actuator size, supported by close-off pressure data, dimensions, operation rate, and access and clearance requirements data.

- i. Damper schedules.

The damper schedule shall contain each damper's and each actuator's identifier, nominal and actual sizes, orientation of axis and frame, direction of blade rotation, spring ranges, operation rate, locations of actuators and damper end switches, arrangement of sections in multisection dampers, and

methods of connecting dampers, actuators, and linkages. The damper schedule shall include the maximum expected velocity through the damper at the intended location and the maximum leakage rate at the operating static-pressure differential. The damper schedule shall contain actuator selection data, supported by calculations of the torque required to move and seal the dampers; and access and clearance requirements.

j. Bill of Materials

Including designator (identifier), model number, and manufacturer.

k. DDC Panel Arrangement drawing with construction details and fabrication details.

l. Wiring Diagrams

Wiring diagrams shall include the interconnection of conductors and cables to the DDC panel terminal blocks and devices and to the identified terminals of starters and packaged equipment, with all necessary jumpers and ground connections. All sources of power required for the DDC system and for packaged equipment control systems shall be identified back to the panel board circuit breaker number, magnetic starter, VFD or packaged control equipment circuit. Unused wiring options contained in standard package equipment shall not be shown.

m. Ladder diagram

n. Sequence of Operation

A sequence of operation based on the contract sequence of operation and cross referenced to the Control Panel wiring diagrams, DDC logic diagrams and/or elementary (ladder) diagram shall be provided.

o. DDC Logic Diagrams

DDC logic diagrams shall be provided detailing both local (stand alone) and global DDC control of equipment.

p. Graphics

A graphic submittal showing the HVAC equipment and their related DDC point in a graphic format shall be included in the system drawings.

q. Installation Details

System drawings shall include necessary installation details for field mounted devices to allow proper installation in the field.

\\*As-Built Control Diagrams\*\; \\*GA\*\.

\\*SD-08 Statements\*\

\\*Factory Testing\*\; \\*GA\*\.

Six copies of the test procedures for the factory test. The test procedures shall explain in detail, step-by-step actions and expected results to demonstrate compliance with the specified requirements, and the methods for simulating the necessary conditions of operation to demonstrate performance of

the system. Written approval by the Government of the factory test procedures shall be one of the prerequisites for scheduling the factory test.

\\*Site Testing\*\; \\*GA\*\.

Six copies of the test procedures for the site testing. The site testing procedures shall identify each item to be tested and shall clearly describe each test. The test procedures shall include a list of the test equipment to be used for site testing, manufacturer and model number, and the date of calibration and accuracy of calibration, within 6 months of the test date.

\\*Year 2000 Compliance\*\; \\*GA\*\  
Testing

As a minimum, all equipment and systems shall be tested to assure that they correctly calculate critical Y2K dates, including, but not limited to:

- (1) 1 January 2000.
- (2) 29 February 2000 (Required because 1900 was not a leap year).
- (3) 9 April 1999 (99th day of the year, which may be 9999 in the Julian calendar, which may be interpreted as an error code).
- (4) 9 September 1999 ( In systems using day, month, year date format, date may be 9999, which may be interpreted as an error code).
- (5) 10 January 2000 (The first date that requires 7 characters).
- (6) 10 October 2000 (The first date that requires 8 characters).

Each item and system shall be tested to assure that the above dates are calculated correctly when they are encountered while the equipment is powered up and functioning properly, and that they will return to the correct date after the date is encountered and the equipment is powered down and restarted.

\\*Performance Verification Testing and Endurance Testing\*\; \\*GA\*\.

Six copies of the test procedures for the performance verification test and the endurance test. The test procedures shall explain in detail, step-by-step actions and expected results to demonstrate compliance with the specified requirements. Written approval by the Government of the performance verification test procedures shall be one of the prerequisites for commencing the performance verification test.

Year 2000 Compliance:

The Contractor shall develop a Y2K validation test procedure and perform the validation test on each individual component or piece of equipment. In those cases where individual components or equipment are interconnected as a system or subsystem, the entire system or subsystem shall also be tested. If there is an interface where time and date data is transferred to any other equipment or system, whether existing or Contractor installed, the interface shall be included in the system validation test. All test procedures require Contracting Officer approval prior to Y2K validation testing, and a Contracting Officer's representative shall witness all testing.

\\*Commissioning Procedures\*\; \\*GA\*\.

Commissioning procedures for each HVAC control system. The procedures shall reflect the language and format of this specification. The commissioning procedures shall refer to the devices by their unique identifiers as shown and shall include step-by-step configuration procedures for each system. The

configuration procedures shall include a configuration check sheet showing all configuration parameters.

Six copies of Commissioning Procedures, in booklet form and indexed, for each system, 60 days prior to system commissioning. Commissioning procedures shall include general instructions on how to set control parameters including setpoints; contact output settings for the specific devices provided. Commissioning procedures shall be specific to each HVAC system, shall detail the steps involved, and shall refer to the procedures in the booklet for specific devices.

\\*SD-09 Reports\*\

\\*Test Reports\*\; \\*GA\*\.

Six copies of the site testing data. Original copies of all data produced during site testing, including results of each test procedure, after approval of the site tests.

\\*Performance Verification and Endurance Report\*\; \\*GA\*\.

Six copies of the performance verification and endurance test report after completion of a successful test.

Documentation of test results for the entire HVAC control system complete, in booklet form and indexed, within 30 days after each test.

\\*Control System Calibration, Adjustments, and Commissioning\*\; \\*GA1\*\.

Six copies of the calibration, adjustment and commissioning report which shall include setpoints and proportional, integral and derivative mode constant settings, calibration data for all instruments and controls, and all the data resulting from adjusting the control system devices and commissioning HVAC control system.

\\*Performance Verification and Opposite Season Test Procedures and Report\*\; \\*GA\*\

The test procedures shall be developed from the design documentation. The procedures shall consist of detailed instructions for test set up, execution, and evaluation of test results. The test reports shall be used to document results of the test. Report shall be delivered to the Government within seven (7) days after completion of the test.

\\*SD-19 Operation and Maintenance Manuals\*\

Manuals shall include a project specific O&M manual and modification to the existing base wide Hardware manual as detailed below.

\\*Project Specific Temperature Controls O&M Manual (New Bldg.)\*\; \\*GA\*\

A complete Temperature Control System Operating and Maintenance Manual (O&M Manual) shall be provided. Each O&M Manual shall be organized into systems and shall contain the manufacturer's complete, detailed operating and maintenance instructions with equipment data for each piece of installed equipment furnished under this contract. Each manual shall be furnished to the Contracting Officer in two (2) original copies prior to the control system acceptance test for the work performed in each building or facility. One of

these copies shall be used during the acceptance testing as a reference, the second shall be submitted for approval. Once the acceptance testing is complete and the O&M manual is approved, the Contractor shall update the existing two copies of the approved O&M manual. These two copies shall be submitted to the Using Service through the Contracting Officer. Additionally, the manual shall include as built documentation for all information provided under the submittal section above. The maintenance manual shall provide descriptions of maintenance for all equipment including inspection, periodic preventative maintenance, fault diagnosis, and repair or replacement of defective components.

Each manual shall be composed of typed instruction sheets 8 1/2 x 11 inches in size, with at least 11 inch by 17 inch drawing sheets folded in, shall have a three ring binder system so that sheets can be easily substituted, and shall clearly indicate information for specific equipment installed and shall contain no other extraneous information. The following identification shall be permanently inscribed on the spine so as to be readable when placed on a shelf: The words "DIRECT DIGITAL CONTROL SYSTEM OPERATION AND MAINTENANCE MANUAL", the building number, name of the Contractor and the Contractor Number. Each manual shall contain a title page with the same preceding information. Each manual shall contain a table of contents and tab sheets. Each manual shall be subdivided into chapters for composite systems. Place the tab sheets at the beginning of each chapter or section and at the beginning of each appendix. The first chapter volume shall contain descriptive information and general data on the temperature control systems for the entire building.

\\*Project Specific O&M Manual (Existing Bldg. Under DDC Control)\*\; \\*GA\*\

The project manual shall contain the information noted above under Project specific O&M manual (new Bldg.). This manual shall also contain necessary information to detail the interface to the existing Building DDC system. This shall include new building riser diagrams, revised table of contents, revisions to wiring diagrams, valve schedules, damper schedule, ladder diagrams, bills of material, sequences of operation, DDC panels, and DDC Logic Diagrams. All modified and or new diagrams shall show the revision date (acceptance date of project) in the lower right corner of the drawing. If the project requires a new section be added to the existing Bldg. O&M manual, the Contractor shall provide the necessary section dividers for inclusion in the Bldg. O&M manual. Each manual shall be furnished to the Contracting Officer in two (2) original copies prior to the control system acceptance test for the work performed in each building or facility. One of these copies shall be used during the acceptance testing as a reference, the second shall be submitted for approval. Once the acceptance testing is complete and the O&M manual is approved, the Contractor shall update the existing two copies with all updates required or approval and provide an additional two copies of the approved O&M manual. These two copies shall be submitted to the Using Service through the Contracting Officer.

The first chapter shall contain data for the entire system and subsequent chapters shall contain the operation and maintenance instructions and equipment data for each different air handling or water system. The last chapter shall contain brochures, catalog cuts, parts lists, manufacturer's data sheets or other publications (including the manufacturer's name and address for each component supplied). The manuals shall also include the names, address, and telephone numbers of each subcontractor installing equipment and systems, and of the nearest service representatives for each item of equipment and each system. Identify each manual's contents on the cover. Update all manuals to include modifications made during installation,

checkout, and acceptance, which show detailed parts data on all equipment subject to repair and maintenance. The O&M manual shall include but not be limited to, the following information:

Sequence of Operation. A sequence of operation based on the Contract sequence of operation and cross referenced to the automatic temperature control diagram and elementary (ladder) diagram shall be provided. The control components shall be referred to by their alphanumeric designator and generic name.

Automatic Temperature Control Diagram. The control diagram shall show:

- ! a. Labels for all components with an alphanumeric name.
- ! b. All set points, throttling ranges, actions, spans etc. near each component.
- ! c. All test points for trouble shooting at all key components and points of signal change.

Ladder (Elementary) Diagrams. The elementary diagrams shall:

- ! a. Show all control system components and their source of power including all required switches, test points, indicator lights, etc.
- ! b. Be cross-referenced to the automatic temperature diagram control panel detail by numbered terminal points enclosed in hexagons.

Start-up Instructions listing the order in which equipment should be started to satisfy system interlocks.

Commissioning instructions for all controllers as applicable per paragraph Commissioning.

Maintenance Check List for each type of control panel and control device, typed on 8 1/2 x 11 inch paper.

Approved as built control panel wiring diagrams.

As-Built System Layouts showing equipment, piping, valves, controls, terminals, sizes and locations (indicate valve or component piece identity as tagged on layouts).

Original equipment manufacturer's operating and maintenance instructions for each piece of equipment, including trouble shooting, checklists, repair and adjustment.

The above information shall be provided in the following formats in addition to the Project specific manuals:

Four sets of 18 inch x 24 inch Drawings  
Two sets of Data files on 1.44 MB disks  
(Please note Drawings shall be drawn on AutoCad Ver. 13)  
Three sets of PVT and commissioning data

\\*Functional Design Manual\*\; \\*GA1\*\.



Two copies of the functional design manual which shall identify the operational requirements for the system and explain the theory of operation, design philosophy, and specific functions. A description of hardware and software functions, interfaces, and requirements shall be included for all system operating modes.

\\*Hardware Manual\*\; \\*GA1\*\.

#### All Projects

Four (4) copies of the hardware manual which shall describe equipment furnished, including:

- a. General description and specifications.
- b. Installation and checkout procedures.
- c. Equipment electrical schematics and layout drawings.
- d. System schematics and I/O device wiring lists.
- e. Alignment and calibration procedures.
- f. Manufacturer's repair parts list indicating sources of supply.

The Contractor shall also modify the existing USAFA hardware manual describing all equipment provided with new cut sheet and o\*M data for any new device provided under the project, but not found in the manual. Additionally, the Contractor shall modify any table of contents, tabs, section dividers etc. as required by the addition of the device cut sheets. The Contractor shall provide four (4) copies of the data for inclusion in the existing base Hardware manuals. These cut sheets shall include manufacturer catalog data, bulletins, cuts, descriptive data including wiring diagrams and control schematics. The following procedures shall also be addressed in this data:

Installation and checkout procedures  
Electrical troubleshooting  
Calibration and/or Service Procedures

The manufacturer repair parts list including local sources of supply and list price shall be included for all parts provided. The list price shall also include any discounts, GSA Schedule Number and/or Federal Stock Number where applicable.

\\*Software Manual\*\; \\*GA1\*\.

Two copies of the software manual which shall describe the functions of all software, and shall include all other information necessary to enable proper loading, testing and operation including, but not limited to the following:

- a. Definitions of terms and functions.
- b. Operator commands.
- c. System access requirements.
- d. Data entry requirements.

- e. Descriptions of application software.
- f. Description of database structure and interface with programs.
- g. Alarms.

\\*Operator's Manual\*\; \\*GA1\*\.

Six complete copies of operation manuals for each HVAC control system, in booklet form and indexed, outlining the step-by-step procedures required for each HVAC control system's startup, operation, and shutdown. The manuals shall include all detail drawings, equipment data, and manufacturer supplied operation manuals for all equipment.

\\*Maintenance Manual\*\; \\*GA1\*\.

Six complete copies of maintenance manuals, indexed in booklet form listing maintenance procedures. The maintenance instructions shall include a maintenance check list for each HVAC control system. Maintenance manuals shall include spare parts data and recommended maintenance tool kits for all control devices. Maintenance instructions shall include recommended repair methods, either field repair, factory repair, or whole-item replacement. The manual shall contain a list of service organizations qualified to service the HVAC control system, including the service organization name and telephone number. If operation and maintenance manuals are provided in a common volume, they shall be clearly differentiated and separately indexed.

#### 1.4 DELIVERY AND STORAGE

Products shall be stored with protection from the weather, humidity and temperature variations, dirt and dust, and other contaminants, within the storage-condition limits published by the equipment manufacturer. Dampers shall be stored so that seal integrity, blade alignment and frame alignment are maintained.

#### 1.5 TESTING

##### 1.5.1 Factory Test

The Contractor shall assemble the factory test DDC system as specified and perform test to demonstrate that the performance of the system satisfies the requirements of this specification. Model numbers of equipment tested shall be identical to those to be delivered to the site. Original copies of all data produced, including results of each test procedure during factory testing shall be delivered to the Government at the conclusion of testing, prior to Government approval of the test. The test results documentation shall be arranged so that all commands, responses, and data acquired are correlated in a manner which will allow for logical interpretation of the data. The factory test setup shall include the following:

- a. Disk Storage.
- b. DDC Panel.
- c. DDC Panel Test Set.
- d. DDC Panel Portable Tester.
- e. Software.

### 1.5.2 Contractor's Field Testing

When installation of the direct digital controls equipment is complete, calibrate field equipment . All testing, calibrating, and adjusting, shall be completed by the Contractor. Perform a detailed cross check of each sensor within the direct digital control system by making a comparison between the reading at the sensor, using a standard at least twice as accurate as the sensor accuracy traceable to the National Bureau of Standards. Perform a cross check of each control point within the direct digital control system by making a comparison between the control command at and field controlled device. Verify that all systems are operable in the specified failure mode upon direct digital control system failure or loss of power. Verify that all systems return to direct digital control system automatically upon resumption of direct digital control system operation or return of power. Submit the results of functional and diagnostic tests, and calibrations to the Contracting Officer in the field. The Contractor shall certify in writing that all materials and equipment have been installed, calibrated, tested, and are in conformance with the technical provisions of the contract. The Government will witness all tests. Advance notice of 48 hours for the Government is required. 14 hours to the Contracting Officer is required for coordination with the Base Civil Engineer.

### 1.5.3 Site Testing

Personnel, equipment, instrumentation, and supplies shall be provided as necessary to perform site testing, adjusting, calibration and commissioning. The tests shall not be conducted during scheduled seasonal off periods of base heating and cooling systems. Wiring shall be tested for continuity and for ground, open, and short circuits. Ground rods installed by the Contractor shall be tested as specified in \-IEEE Std 142-\ . Written Government approval of the specific site testing procedures shall be obtained prior to any test. Written notification of any planned site testing, commissioning or tuning shall be given at least 14 calendar days prior to any test.

### 1.5.4 Control System Calibration, Adjustments, and Commissioning

Instrumentation and controls shall be calibrated and the specified accuracy shall be verified using test equipment with calibration traceable to NIST standards. Mechanical control devices shall be adjusted to operate as specified. Control parameters and logic (virtual) points including control loop setpoints, shall be adjusted before the system is placed on line. Control system commissioning shall be performed for each HVAC system. The report describing results of functional tests, diagnostics, and calibrations, including written certification, shall state that the installed complete system has been calibrated, tested, and is ready to begin performance verification testing. The report shall also include a copy of the approved performance verification test procedure.

### 1.5.5 Performance Verification Test

The Contractor shall demonstrate compliance of the complete HVAC control system with the contract documents . Using approved test plans and procedures previously approved, physical and functional requirements of the project, including communication requirements shall be demonstrated and shown. The performance verification test procedures shall explain, step-by-step, the actions and expected results that will demonstrate that the control systems perform in accordance with the sequences of operation. The performance

verification test shall not be started until after receipt of written permission by the Contracting Officer, based on the written permission by the, Government, Contractor's written certification of successful completion of site testing and training.

#### 1.5.6 Opposite Season Test

During the warranty period, but not later than six months from completion of the endurance test, the Contractor shall conduct an opposite season test to demonstrate that the system functions properly during the opposite climatic season such as summer or winter. Test reports and other documentation as specified shall be delivered to the Government.

#### 1.5.7 Endurance Test

The endurance test shall be used to demonstrate the specified overall system reliability requirement of the completed system. The endurance test shall not be started until the Government notifies the Contractor in writing that the performance verification test is satisfactorily completed. The Government may terminate the testing at any time when the system fails to perform as specified. Upon termination of testing by the Government or by the Contractor, the Contractor shall commence an assessment period as described for Phase II. Upon successful completion of the endurance test, the Contractor shall deliver test reports and other documentation as specified to the Government prior to acceptance of the system.

##### a. Phase I (Testing)

The test shall be conducted 24 hours per day, 7 days per week, for 15 consecutive calendar days, including holidays, and the system shall operate as specified. The Contractor shall make no repairs during this phase of testing unless authorized by the Government in writing.

##### b. Phase II (Assessment)

After the conclusion of Phase I, the Contractor shall identify failures, determine causes of failures, repair failures, and deliver a written report to the Government. The report shall explain in detail the nature of each failure, corrective action taken, results of tests performed, and shall recommend the point at which testing should be resumed. After delivering the written report, the Contractor shall convene a test review meeting at the jobsite to present the results and recommendations to the Government. As a part of this test review meeting, the Contractor shall demonstrate that all failures have been corrected by performing appropriate portions of the performance verification test. Based on the Contractor's report and test review meeting, the Government may require that the Phase I test be totally or partially rerun. After the conclusion of any retesting which the Government may require, the Phase II assessment shall be repeated as if Phase I had just been completed.

#### 1.5.8 Coordination with HVAC System Balancing

The HVAC control system shall be tuned after all air-system and hydronic-system balancing has been completed, minimum damper positions set and a report issued. Commissioning may be performed prior to or simultaneous with HVAC system balancing.

#### 1.5.9 Posted Instructions

Instructions on letter-size sheets and half-size plastic laminated drawings for each system, showing the final installed conditions, shall be placed in each HVAC control panel. The posted instructions shall include the control sequence, control schematic, ladder diagram, wiring diagram, valve schedules, damper schedules, commissioning procedures, and preventive maintenance instructions.

## 1.6 TRAINING

### 1.6.1 General

The training course shall be conducted for 7 operating staff members designated by the Contracting Officer in the maintenance and operation of the DDC system, including specified hardware and software. A training day is defined as 8 hours of classroom instruction, including breaks and lunchtime, Monday through Friday, during the daytime shift in effect at the training facility. For guidance in planning the required instruction, the Contractor shall assume that the attendees will have a high school education or equivalent, and are familiar with HVAC systems. No training shall be scheduled until training manuals and O&M manuals have been approved by the Government. Provide competent instructors to give full instruction to the designated personnel in the adjustment, operation and maintenance of the system installed rather than a general training course. Instructors shall be thoroughly familiar with all aspects of the subject matter they are to teach.

A minimum of two complete training manuals shall be provided for the specified training sessions and shall be archived at the project site. If identical manuals already exist in the AFA Civil Engineering Library there is no need to duplicate the existing manuals. Also make available for the training sessions, high quality company produced standard VHS format video tapes related to the operation and maintenance of the Contractor supplied DDC controllers, systems and equipment. These VHS training tapes will also be achieved in the Base Civil Engineering Library if they do not already exist. All training shall be held during normal work hours of 7:15 A.M. to 4:00 P.M. weekdays at the Contractor's training facility as follows:

#### 1.6.1.1 First Phase

Conduct a minimum of 1 day (8 hours) of classroom training prior to final acceptance at a time mutually agreeable between the Contractor and the Government. Train operating personnel in functional operations of the system installed and the procedures that the operators will employ for system operation. This phase of training shall include but not be limited to the following:

- General system architecture
- Operation of equipment
- Interface controller programming
- Command line abbreviations
- Reports and Summaries
- Operator control functions
- Operation of temperature control system including proportional control theory and operation.

#### 1.6.1.2 Second Phase

The second phase of training shall be conducted two to four weeks after system acceptance. Conduct a minimum of 1 day (8) hours of training for maintenance

personnel. Training shall include general system layout, calibration, maintenance and trouble shooting of all components, sensors and controllers.

#### 1.6.2 Training Course Content

The training course shall cover all the material contained in the Operating and Maintenance Instructions, the layout and location of each HVAC control panel, the layout of one of each type of unitary equipment and the locations of each, the location of each system-control device external to the panels, preventive maintenance, troubleshooting, diagnostics, calibration, adjustment, commissioning, tuning, and repair procedures as indicated above. Typical systems and similar systems may be treated as a group, with instruction on the physical layout of one such system. The results of the performance verification test and the calibration, adjustment and commissioning report shall be presented as benchmarks of HVAC control-system performance by which to measure operation and maintenance effectiveness.

#### 1.7 WARRANTY AND WARRANT SERVICE

##### 1.7.1 General Requirements

Provide all services, materials and equipment as necessary for the successful operation of the entire Direct Digital Control System for a period of 1 year after successful completion and acceptance (of the Performance Verification Test). Impacts on facility operations shall be minimized.

##### 1.7.2 Description of Work

The adjustment and repair of the system shall include the manufacturer's required adjustments of computer equipment, software updates, transmission equipment and instrumentation and control devices. Warranty service shall be defined as all work necessary to provide an operable system under this specification. Specifically any defects where hardware, firmware or software will be corrected for a period of one year after acceptance. Extension/Control System includes all FIC equipment, software updates, Transmission equipment, FIC panels, and all new sensors and control devices.

##### 1.7.3 Personnel

Provide qualified service personnel to accomplish work promptly and satisfactorily. The Contracting Officer shall be advised in writing of the name of the designated service representative, and of any changes in personnel.

##### 1.7.4 Scheduled Inspections

Two inspections shall be performed at 6 month intervals (or less if required by the manufacturer), and all work required shall be performed. Inspections shall be scheduled in August and January. These inspections shall include:

- a. Visual checks and operational tests of all equipment.
- b. Fan checks and filter changes for all control system equipment.
- c. Clean all control system equipment including interior and exterior surfaces.

d. Check and calibrate each field device. Check and calibrate 50 percent of the total analog points during the first inspection. Check and calibrate the remaining 50 percent of the analog points during the second major inspection. Certify analog test instrumentation accuracy to be twice that of the device being calibrated. Randomly check at least 25 percent of all digital points for proper operation during the first inspection. Randomly check at least 25 percent of the remaining digital points during the second inspection.

e. Run all system software diagnostics and correct all diagnosed problems.

f. Resolve any previous outstanding problems.

#### 1.7.5 Scheduled Work

This work shall be performed during regular working hours, Monday through Friday, excluding legal Federal holidays.

#### 1.7.6 Emergency Service

The Government will initiate service calls when the system is not functioning properly. Qualified personnel shall be available to provide service to the system. A telephone number where the service supervisor can be reached at all times shall be provided. Service personnel shall be at the site within 24 hours after receiving a request for service. The control system shall be restored to proper operating condition within 3 calendar days after receiving a request for service.

#### 1.7.7 Operation

Scheduled adjustments and repairs shall include verification of the control system operation as demonstrated by the applicable tests of the performance verification test.

#### 1.7.8 Supervision

Provide supervision, satisfactory to the Government, with full authority to act for the Contractor. The supervisor shall effect daily liaison during the normal working hours with the Government. Provide such supervision for all work done.

#### 1.7.9 Records and Logs

Keep records and logs of each task. Organize cumulative records for each major component, and for the complete system chronologically. Maintain continuous log for all devices. The log shall contain all initial analog span and zero calibration values and all digital points. Complete logs shall be kept and shall be available for inspection onsite, demonstrating that planned and systematic adjustments and repairs have been accomplished for the control system.

#### 1.7.10 Work Requests

Each service call request shall be recorded as received and shall include the serial number identifying the component involved, its location, date and time the call was received, nature of trouble, names of the service personnel

assigned to the task, instructions describing what has to be done, the amount and nature of the materials to be used, the time and date work started, and the time and date of completion. A record of the work performed shall be submitted within 5 days after work is accomplished.

#### 1.7.11 System Modifications

Recommendations for system modification shall be submitted in writing. System modifications, including operating parameters and control settings, shall not be made without prior approval of the Contracting Officer. Any modifications made to the system shall be incorporated into the operations and maintenance manuals, and other documentation affected.

#### 1.7.12 Software

Updates to the software shall be provided for system; operating and application software shall be updated and operation in the system shall be verified. Updates shall be incorporated into operations and maintenance manuals, and software documentation. There shall be at least one scheduled update near the end of the first year's warranty period, at which time the latest released version of the Contractor's software shall be installed and validated.

#### 1.8 \\*As-Built Control Diagrams\*\

Provide laminated as built drawings, equipment flow, panel wiring, DDC logic diagrams and sequence of operation for each piece of equipment controlled in the respective control panel. The laminated drawings shall be attached to the panel to prevent removal. Condensed operating instructions explaining preventive maintenance procedures, methods of checking the system for normal safe operation, and procedures for safely starting and stopping the system manually shall be prepared in typed form laminated as specified above and attached in the panel document set. Proposed diagrams, instructions, and other sheets shall be submitted and approved prior to lamination and attachment to panel. The approved laminated instructions shall be installed in each control panel before acceptance testing of the systems. Provide a copy of each revised diagram on AutoCad Release 13 in addition to the laminated copy.

### PART 2 PRODUCTS

#### 2.1 GENERAL EQUIPMENT REQUIREMENTS

Units of the same type of equipment shall be products of a single manufacturer. Each major component of equipment shall have the manufacturer's name and address, and the model and serial number in a conspicuous place. Materials and equipment shall be standard products of a manufacturer regularly engaged in the manufacturing of such products, which are of a similar material, design and workmanship. The standard products shall have been in a satisfactory commercial or industrial use for 2 years prior to use on this project. The 2 years use shall include applications of equipment and materials under similar circumstances and of similar size. The 2 years experience shall be satisfactorily completed by a product which has been sold or is offered for sale on the commercial market through advertisements, manufacturers' catalogs, or brochures. Products having less than a 2 year field service record will be acceptable if a certified record of satisfactory field operation, for not less than 6,000 hours exclusive of the manufacturer's factory tests, can be shown. The equipment items shall be supported by a



service organization. Items of the same type and purpose shall be identical, including equipment, assemblies, parts and components. Automatic temperature controls shall be direct digital controls that will provide the required sequence of operation. No pneumatics will be allowed .

#### 2.1.1 Electrical and Electronic Devices

Electrical, and electronic devices not located within an HVAC control panel shall have a \-NEMA ICS 1-\ enclosure in accordance with \-NEMA 250-\ unless otherwise shown.

#### 2.1.2 Standard Signals

The output of all analog transmitters and the analog input and output of all DDC panels shall be 4-to-20 mAdc signals. The signal shall originate from current-sourcing devices and shall be received by current-sinking devices.

#### 2.1.3 Ambient Temperature Limits

DDC panels and SN's shall have ambient condition ratings of plus 32 to 122 degrees F and 10 to 90 percent relative humidity, noncondensing. Devices installed outdoors shall operate within limit ratings of minus 35 to 150 degrees F. Instrumentation and control elements shall be rated for continuous operation under the ambient environmental temperature, pressure, humidity, and vibration conditions specified or normally encountered for the installed location. Other equipment shall, unless designated otherwise, operate properly under ambient environmental conditions of 60 to 85 degrees F. and a relative humidity of 20 to 80 percent.

#### 2.2 NOT USED

#### 2.3 WIRING

##### 2.3.1 Terminal Blocks

Terminal blocks shall be insulated, modular, feed-through, clamp style with recessed captive screw-type clamping mechanism, shall be suitable for rail mounting, and shall have end plates and partition plates for separation or shall have enclosed sides.

##### 2.3.2 Control Wiring for 24-Volt Circuits

Control wiring for 24-volt circuits shall be 18 AWG minimum and shall be rated for 300-volt service.

##### 2.3.3 Wiring for 120-Volt Circuits

Wiring for 120-volt circuits shall be 14 AWG minimum and shall be rated for 600-volt service.

##### 2.3.4 Instrumentation Cable

Instrumentation cable shall be 18 AWG, stranded copper, single- or multiple-twisted, minimum 2 inch lay of twist, 100 percent shielded pairs, and shall have a 300-volt insulation. Each pair shall have a 20 AWG tinned-copper drain wire and individual overall pair insulation. Cables shall have an overall aluminum-polyester or tinned-copper cable-shield tape, overall 20 AWG tinned-copper cable drain wire, and overall cable insulation.

## 2.4 ACTUATORS

### 2.4.1 General Requirements

Actuators shall be electric or electronic as indicated. Actuators shall fail to their spring-return positions on signal or power failure and shall have a visible position indicator. Actuators shall open or close the devices to which they are applied within 60 seconds after a full scale input signal change. Electric or electronic actuators operating in parallel or in sequence shall have an auxiliary actuator driver.

### 2.4.2 Damper Actuators

The actuators shall be provided with mounting and connecting hardware. Actuators shall smoothly operate the devices to which they are applied. Actuators shall fully open and close the devices to which they are applied and shall have a full stroke response time of 60 seconds or less. The actuator stroke shall be limited by an adjustable stop in the direction of power stroke.

## 2.5 Automatic Control Valves & Valve Operators

Automatic control valves shall be sized for 5 psig maximum differential at full flow for water service. Valves shall have packless, modulating, electrically or magnetic operators with a minimum 500:1 turndown ratio. Nominal body rating shall be not less than 125 psig. Valves shall have stainless-steel stems and stuffing boxes with extended necks to clear the piping insulation. Valve bodies shall be designed for not less than 125 psig working pressure or 150 percent of the system operating pressure, whichever is greater. Valve leakage rating shall be 0.01 percent of rated Cv. Unless otherwise specified, bodies for valves 1-1/2 inches and smaller shall be brass or bronze, with threaded or union ends; bodies for 2 inch valves shall have threaded ends; and bodies for valves 2 to 3 inches shall be of brass, bronze or iron. Bodies for valves 2-1/2 inches and larger shall be provided with flanged-end connections. Valve Cv shall be within 100 to 125 percent of the Cv required.

### 2.5.1 NOT USED

### 2.5.2 Terminal Unit Valves, 1/2 inch to 1 inch:

Valves shall be sized for a 5 psi drop. Valve body shall be nickel plated brass, rated at 125 psig. Thermic, two-position, stepped or 3 point floating type valves will not be allowed. Terminal unit valves shall be arranged to automatically close in the absence of control power. Valve body shall accept 50% open manual positioning for system flushing during start-up. Actuator shall be removable for ease of installation and servicing.

### 2.5.3 Primary Equipment Valves, 1/2 inch to 4 inch:

Valves shall be equipped with a handwheel, or manual positioner mounted adjacent to valve, to allow manual positioning of valve in the absence of control power.

### 2.5.4 NOT USED

### 2.5.5 Valves for Chilled Water and Glycol Service

Internal valve trim shall be bronze except that valve stems may be type 316 stainless steel. Valve Cv shall be within 100 to 125 percent of the Cv required. Valves 4 inches and larger shall be butterfly.

#### 2.5.6 Valves for Hot Water Service

For hot water service below 250 degrees F , Internal trim for valves controlling water 210 degrees F or less shall be brass or bronze. Nonmetallic parts of hot-water control valves shall be suitable for a minimum continuous operating temperature shall be suitable for a minimum continuous operating temperature of 250 degrees F or 50 degrees F above the system design temperature, whichever is higher.

### 2.6 DAMPERS

#### 2.6.1 Damper Operator

Electric/electronic damper operators shall be provided for each automatic damper and shall operate on 24VAC and have sufficient capacity to operate the damper under all conditions. Each operator shall be full-proportioning or two-position type as specified under sequence of control and shall be provided with spring-return for normally closed or normally open position, as indicated in the drawings, for fire, freeze, or moisture protection upon power interruption. Dampers shall be capable of moving full-stroke in less than six (6) seconds. Operators shall be adjusted to operate in sequence as required by the operating characteristics of the system and as specified on the drawings and in paragraph COMMISSIONING.

#### 2.6.2 Damper Assembly

A single damper section shall have blades no longer than 48 inches and shall be no higher than 72 inches. Damper shall be minimum 13 gauge steel. Maximum damper blade width shall be 8 inches. Larger sizes shall be made from a combination of sections. Dampers shall be steel, or other materials where indicated. Flat blades shall be made rigid by folding the edges. Blade-operating linkages shall be within the frame so that blade-connecting devices within the same damper section shall not be located directly in the air stream. Damper axles shall be 0.5 inch minimum, plated steel rods supported in the damper frame by stainless steel or bronze bearings. Blades mounted vertically shall be supported by thrust bearings. Pressure drop through dampers shall not exceed 0.04 inch water gauge at 1,000 feet per minute in the wide-open position. Frames shall not be less than 2 inches in width. Dampers shall be tested in accordance with \-AMCA 500-\.

#### 2.6.3 Operating Links

Operating links external to dampers, such as crankarms, connecting rods, and line shafting for transmitting motion from damper actuators to dampers, shall withstand a load equal to at least twice the maximum required damper-operating force. Rod lengths shall be adjustable. Links shall be brass, bronze, zinc-coated steel, or stainless steel. Working parts of joints and clevises shall be brass, bronze, or stainless steel. Adjustments of crankarms shall control the open and closed positions of dampers.

#### 2.6.4 Damper Types

Dampers shall be parallel blade type.

#### 2.6.4.1 Outside Air, Return Air, and Relief Air Dampers

Outside air, return air and relief air dampers shall be provided where shown.

Blades shall have interlocking edges and shall be provided with compressible seals at points of contact. The channel frames of the dampers shall be provided with jamb seals to minimize air leakage. Dampers shall not leak in excess of 20 cfm per square foot at 4 inches water gauge static pressure when closed. Seals shall be suitable for an operating temperature range of minus 40 degrees F to 200 degrees F. Dampers shall be rated at not less than 2,000 feet per minute air velocity.

#### 2.6.5 Damper End Switches

Each end switch shall be a hermetically sealed switch with a trip lever and over-travel mechanism. The switch enclosure shall be suitable for mounting on the duct exterior and shall permit setting the position of the trip lever that actuates the switch. The trip lever shall be aligned with the damper blade.

### 2.7 SMOKE DETECTORS

Smoke detectors shall be as specified in Section \=16721=\ FIRE DETECTION AND ALARM SYSTEM. Duct smoke detectors shall be supplied with an integral auxiliary contact, providing a digital input to the DDC system.

### 2.8 INSTRUMENTATION

#### 2.8.1 Measurements

Each transmitter shall have offset and span adjustments. Transmitters shall be calibrated to provide the following measurements, over the indicated ranges, for a linear output of 4-to-20 mAdc:

- a. Conditioned space temperature, from 50 to 85 degrees F.
- b. Chilled water temperature, from 30 to 100 degrees F.
- c. Heating hot water temperature, from 100 to 250 degrees F.
- d. Outside air temperature, from minus 30 to plus 130 degrees F.

#### 2.8.2 Temperature Instruments

Temperature sensors shall be linear precision elements with ranges appropriate for each specific application.

Space (room) sensors shall be available with setpoint adjustment and override switch. Space sensor shall have a portable service tool jack.

Duct mounted averaging sensors shall utilize a sensing element incorporated in a copper capillary with a minimum of length of 20 feet. The sensor shall be installed according to the manufactures recommendation and looped and fastened at a minimum of every 36 inches.

Sunshields shall be provided for outside air sensors.

Thermowells for all immersion sensors shall be stainless steel or brass as required for the application.

#### 2.8.2.1 Room Temperature Sensors (Thermostats)

Room temperature sensors (thermostats) shall be thermistor type, range 32°F - 86°F, accuracy  $\pm 0.3^\circ\text{F}$ , with local manual set point adjust feature. Sensor shall be equipped with an RJ-12 socket mounted in the bottom of the housing for connection by the portable service terminal SMART II/TOOL.

#### 2.8.2.2 Duct Temperature Sensors

Duct temperature sensors shall be resistance temperature detector (RTD) type, range 32°F - 86°F, accuracy  $\pm 0.3^\circ\text{F}$ .

#### 2.8.2.3 Outside Air Temperature Sensors

Outside air temperature sensors shall be resistance temperature detector (RTD) type, range -36°F - 220°F, accuracy  $\pm 0.3^\circ\text{F}$ , mounted in an enclosure designed to withstand outdoor conditions at the site. Sun shields shall be provided for sensors exposed to direct sunlight.

#### 2.8.2.4 Immersion Temperature Sensors and Thermowells

Immersion temperature sensors shall be resistance temperature detector (RTD) type, range -50°F - 248°F, accuracy  $\pm 0.3^\circ\text{F}$ . Thermowells shall be provided as indicated and shall be brass, or series 300 stainless steel providing proper thermal contact with the sensor element without requiring heat-conducting compound.

#### 2.8.2.5 Averaging Temperature Sensors

Averaging temperature sensors shall be resistance temperature detector (RTD) type, range 32°F - 86°F, accuracy  $\pm 0.3^\circ\text{F}$ . Averaging temperature sensors shall be furnished with copper continuous sensing elements, length as required and shall be of sufficient length to ensure that the resistance represents an average over the cross section in which it is installed (ie. fastened every 36 inches and should be a minimum of 240 inches in length). Where standard length of element is less than that required, multiple sensors shall be provided and connected such that one input is provided to the DDC system for the sensed variable.

2.8.3 NOT USED

2.8.4 NOT USED

2.8.5 NOT USED

#### 2.8.6 PRESSURE INSTRUMENTS

##### 2.8.6.1 Pressure Sensors and Differential Pressure Sensors

Pressure sensors and differential pressure sensors shall be temperature-compensated and shall vary the output signal with a change in pressure (or differential pressure), as indicated. Sensors shall be provided for room or duct mounting, as indicated, suitable for application with linearity of 1.5% of full scale. Sensors shall be capable of withstanding up to 150% of rated pressure without damage. The differential pressure sensor shall vary its output voltage linearly from 0 to 10 Vdc according to the differential pressure between high and low pressure points. The sensor shall be compatible with 14 to 30 Vdc supply voltage range.

## 2.8.7 Differential Pressure Switches

Differential pressure switches shall have a snap-action Form C contact SPDT rated for the application, switching at an adjustable differential pressure set point. Switches shall be adjustable over the operating pressure range. The differential pressure between the two pressure connections shall deflect a spring-loaded silicon diaphragm. Switches shall have a repetitive accuracy of  $\pm 1\%$  of their operating range of 0.08" water to 1.2" water and better than plus or minus 0.2" water between the range of 0.2" water and to 4.0 " water.

### 2.8.8 NOT USED

### 2.8.9 Thermowells

Thermowells shall be brass or Series 300 stainless steel with threaded brass plug and chain, 2 inch lagging neck and extension type well. Inside diameter and insertion length shall be as required for the application.

### 2.8.10 Sunshields

Sunshields for outside air temperature sensing elements shall prevent the sun from directly striking the temperature sensing elements. The sunshields shall be provided with adequate ventilation so that the sensing element responds to the ambient temperature of the surroundings. The top of each sunshield shall have a galvanized metal rainshield projecting over the face of the sunshield. The sunshields shall be painted white.

## 2.9 THERMOSTATS

### 2.9.1 General

Thermostat ranges shall be selected so that the setpoint is adjustable without tools between plus or minus 10 degrees F of the setpoint shown. Thermostats shall be electric

### 2.9.2 Nonmodulating Room Thermostats

Contacts shall be single-pole double-throw (SPDT), hermetically sealed, and wired to identified terminals. Maximum differential shall be 5 degrees F. Room thermostats shall be enclosed with separate locking covers (guards).

### 2.9.3 NOT USED

### 2.9.4 NOT USED

### 2.9.5 Nonmodulating Capillary Thermostats and Aquastats

Each thermostat shall have a capillary length of at least 5 feet, shall have adjustable direct reading scales for both setpoint and differential, and shall have a differential adjustable from 6 to 16 degrees F. Aquastats shall be of the strap-on type, with 10 degrees F fixed differential.

### 2.9.6 Freezestats

Freezestats shall be manual reset, low temperature safety thermostats, with NO and NC contacts and a 20 foot element which shall respond to the coldest 18 inch segment.

#### 2.9.7 Modulating Capillary Thermostats

Each thermostat shall have either one output signal, two output signals operating in unison, or two output signals operating in sequence, as required for the application. Thermostats shall have adjustable throttling ranges of 4 to 8 degrees F for each output.

#### 2.10 NOT USED

#### 2.11 INDICATING DEVICES

##### 2.11.1 Insertion Thermometers

Thermometers for insertion in ductwork and piping systems shall have brass, malleable iron, or aluminum alloy case and frame, clear protective face, permanently stabilized glass tube with indicating-fluid column, white face, black numbers, and a 9 inch scale. Thermometers for piping systems shall have rigid stems with straight, angular, or inclined pattern, and shall conform to \-ASME PTC 19.3-\.

##### 2.11.2 Thermometer Stems

Thermometer stems shall have expansion heads as required to prevent breakage at extreme temperatures. On rigid-stem thermometers, the space between bulb and stem shall be filled with a heat-transfer medium.

##### 2.11.3 Air Duct Thermometers

Air duct thermometers shall have perforated stem guards and 45 degree adjustable duct flanges with locking mechanism.

##### 2.11.4 Averaging Thermometers

Averaging thermometers shall have 3-1/2 inch (nominal) dial, with black legend on white background, and pointer traveling through a 270 degree arc.

##### 2.11.5 Accuracy

Thermometers shall have an accuracy of plus or minus 1 percent of scale range. Thermometers shall have the following ranges:

- a. Mixed air, return air, cooling-coil discharge, chilled water, and glycol cooling temperatures: 0 to 100 degrees F in 1 degree graduations.
- b. Heating-coil discharge temperature: 30 to 180 degrees F in 2 degree graduations.
- c. Hydronic heating systems below 220 degrees F: 40 to 240 degrees F in 2 degree graduations.
- d. Glycol heating service temperature: 40 to 240 degrees F in 2 degree F degree graduations.

##### 2.11.6 Pressure Gauges

Gauges shall be 2 inch (nominal) size, back connected, suitable for field or panel mounting as required, shall have black legend on white background, and shall have a pointer traveling through a 270 degree arc. Accuracy shall be

plus or minus 3 percent of scale range. Gauges shall meet requirements of \-ASME B40.1-\.

2.11.6.1 NOT USED

2.11.6.2 NOT USED

#### 2.11.6.3 Hydronic System Gauges

Gauges for hydronic system applications shall have ranges and graduations as indicated.

#### 2.11.6.4 Low-Differential Pressure Gauges

Gauges for low-differential pressure measurements shall be a minimum of 3.5 inch (nominal) size with two sets of pressure taps, and shall have a diaphragm-actuated pointer, white dial with black figures, and pointer zero adjustment. Gauges shall have ranges and graduations as shown. Accuracy shall be plus or minus 2 percent of scale range.

### 2.12 RELAYS

#### 2.12.1 Control Relays

Control relay contacts shall have utilization category and ratings selected for the application, with a minimum of 2 sets of Form C Contacts (two normally open, two normally closed), in accordance with NEMA ICS 1, enclosed in a dust-proof enclosure. Relays shall be rated for a minimum life of one million operations. Operating time shall be 20 milliseconds or less, with release time of 20 milliseconds or less. Relays shall be equipped with coil transient suppression devices to limit transients to 150 percent of rated coil voltage.

Time delay relays shall be 2 PDT with 8-pin connectors, dust cover, and a matching rail mounted socket. Adjustable timing range shall be 0 to 3 minutes. Power consumption shall not be greater than 3 watts.

##### 2.12.1.1 Latching Relays

Latching relay contacts shall be rated for the application with a minimum of 2 sets of Form C contacts enclosed in a dust-proof enclosure. Relays shall have silver cadmium contacts with a minimum life span rating of one million operations. Operating time shall be 20 milliseconds or less, with release time of 10 milliseconds or less. Relays shall be equipped with coil transient suppression devices to limit transients to non damaging levels.

##### 2.12.1.2 Contactors

Contactors shall be of the single coil, electrically operated, mechanically held type. Positive locking shall be obtained without the use of hooks, latches, or semi-permanent magnets. Contacts shall be double break silver to silver type protected by arcing contacts. Number of contacts and ratings shall be selected for the application. Operating and release times shall be 100 milliseconds or less. Contactors shall be equipped with coil transient suppression devices to limit transients to non damaging levels.

##### 2.12.1.3 Solid State Relays

Input output isolation shall be greater than 1000 megohms with a breakdown voltage of 1500 V root mean square or greater at 60 Hz. The contact life shall be 10 million operations or greater. The ambient temperature range shall be minus 20 to plus 140 degrees F. Input impedance shall not be less than 500 ohms. Relays shall be rated for the application. Operating and release times shall be 1 millisecond or less. Transient suppression shall be



provided as an integral part of the relay to limit transients to non damaging levels.

#### 2.12.1.4 Current Sensing Relays

Motor status indications, where shown on the plans, shall be provided via current sensing relays. Current sensing relays shall be self-powered and shall have selectable AC ranges of 1-6 amps, 6-40 amps and 4-200 amps. The switch output contact shall be rated for 30 VDC, 15 amps. Threshold setting shall be fully adjustable within the selected range and response time shall be 0.25 seconds or less. Circular window within the current sensing switch shall accept #2 wire or smaller and the window shall be a minimum of 0.520 inches diameter. Housing material shall have UL listed flame retardant properties.

#### 2.13 FLOW SWITCHES

Flow switches shall be of the paddle type equipped with SPDT contacts to establish proof of flow. Flow switches shall be of the water-proof type.

2.14 NOT USED

2.15 NOT USED

#### 2.16 DOMESTIC WATER METER

Domestic water meter shall be as specified in Section \=15400=\ PLUMBING, GENERAL PURPOSE.

#### 2.17 FIELD HARDWARE

##### 2.17.1 Direct Digital Control (DDC) Panel Hardware

DDC panels shall be microcomputer based with sufficient memory to perform specified DDC panel functions and operations. The panel shall not be dependent on logic or data from an external computer. The panel shall contain necessary I/O functions to connect to field sensors and control devices. The DDC panel shall include:

- a. Main power switch.
- b. Power on indicator.
- c. Portable tester connector.
- d. On-Off-Auto switches for each digital output. The status of these switches will be available to the DDC panel for further processing.
- e. Minimum-Maximum-Auto switches, or Auto-Manual switches with manual potentiometer, for each analog output. The status of these switches will be available to the DDC panel for further processing.

##### 2.17.1.1 Sealed Battery Backup

A sealed battery backup for the DDC panel memory and real time clock function sufficient to maintain them for a minimum period of 8 hours shall be provided.

Automatic charging of batteries shall be provided, or alternately, lithium batteries sized to provide a minimum of 30 days operation and a shelf life of 2 years shall be provided. A low battery alarm with indication for each DDC

panel shall be provided. Alternatively, capacitors may be provided to maintain memory and clock function for a minimum of 8 hours.

#### 2.17.1.2 Electrical Service Outlet for use with Test Equipment

A single phase, 120 Vac electrical service outlet for use with test equipment shall be furnished either inside or within 6 feet of the DDC panel enclosure.

#### 2.17.1.3 Locking Type Mounting Cabinets

Locking type mounting cabinets, with common keying and door switch wired to and DDC panel input for intrusion alarm annunciation, shall be furnished.

#### 2.17.1.4 Failure Mode

Upon failure of the DDC panel, all connected points shall be forced to the failure mode shown in the I/O summary tables. DDC panels shall be in accordance with \-NEMA ICS 6-\ NEMA 12 with lock and key. Each panel shall be provided with a door mounted digital indicator and selector switch which shall indicate the following by LED or LCD readout:

- a. Supply air temperature
- b. Return air temperature
- c. Mixed air temperature
- d. Outside air temperature

#### 2.17.1.5 Portable Tester

Provisions for connection of a portable tester shall be furnished at each DDC panel location. One portable tester shall be provided to the government after testing.

#### 2.17.1.6 I/O Functions

I/O functions shall be provided as part of the DDC panel and shall be in accordance with the following:

a. The Analog Input (AI) function shall monitor each analog input, perform A-to-D conversion, and hold the digital value in a buffer for interrogation. The A-to-D conversion shall have a minimum resolution of 10 bits plus sign. Signal conditioning shall be provided for each analog input.

Analog inputs shall be individually calibrated for zero and span, in hardware or in software. The AI shall incorporate common mode noise rejection of 50 dB from 0 to 100 Hz for differential inputs, and normal mode noise rejection of 20 dB at 60 Hz from a source impedance of 10,000 ohms. Input ranges shall be within the range of 4-to-20 mAdc.

b. The Analog Output (AO) function shall accept digital data, perform D-to-A conversion, and output a signal within the range of 4-to-20 mAdc. D-to-A conversion shall have a minimum resolution of 8 bits plus sign. Analog outputs shall be individually calibrated for zero and span. Short circuit protection on voltage outputs and open circuit protection on current outputs shall be provided. An individual gradual switch for manual override of each analog output and means of physically securing access to these switches shall be provided. Each AO shall have a three-position switch for selection of the DDC control signal, no control, or a locally generated control signal for connection to the controlled device. Feedback shall be provided to the system as to the status of the output (manual control or automatic). All switches

shall be either of a key operated design with the same keying system used for other outputs or otherwise suitably protected from unauthorized access.

c. The Digital Input (DI) function shall accept on-off, open-close, or other change of state (two state data) indications. Isolation and protection against an applied steady-state voltage up to 180 Vac peak shall be provided.

d. The Digital Output (DO) function shall provide contact closures for momentary and maintained operation of output devices. Closures shall have a minimum duration of 0.1 second. DO relays shall have an initial breakdown voltage between contacts and coil of at least 500 V peak. Electromagnetic interference suppression shall be furnished on all output lines to limit transients to nondamaging levels. Protection against an applied steady-state voltage up to 180 Vac peak shall be provided. Minimum contact rating shall be 1 ampere at 24 Vac. Key locked HOA switches shall be provided for manual override of each digital output. Feedback shall be provided to the system as to the status of the output (manual control or automatic). All switches shall be common keyed.

e. The pulse accumulator function shall have the same characteristics as the DI. In addition, a buffer shall be provided to totalize pulses and allow for interrogation by the DDC panel. The pulse accumulator shall accept rates up to 20 pulses per second. The totalized value shall be reset to zero upon operator's command.

f. Signal conditioning for sensors shall be provided as specified.

2.17.2 NOT USED

2.17.3 NOT USED

#### 2.17.4 DDC Panel Portable Tester

A portable test device shall be provided which includes a keyboard, display, and mass storage sufficient to perform, as a minimum, the following functions through the portable tester:

a. Load all DDC panel software and information, including parameters and constraints.

b. Display the status or value of all points connected to the DDC panel.

c. Control the outputs connected to the DDC panel.

d. Perform DDC panel diagnostic testing.

e. Provide operator interface in alphanumerics and decimal (hexadecimal, octal, and binary display shall not be utilized).

f. Accept DDC panel software and information from the existing EMCS/UMCS command entry device panel for subsequent loading into a specific DDC panel. Provide all necessary software and hardware required to support this function.

#### 2.17.5 DDC Panel Test Set

A DDC panel test set, consisting of a DDC panel and I/O simulator, shall be provided for use, located as shown, connected via a separate data transmission media (DTM) circuit. The I/O simulator shall manually generate the values or status for all I/O functions specified. The I/O simulator shall receive, display, and send different types of signals. Cables, connectors, test jacks,

controls, indicators, and equipment required to simulate the I/O sensors and control devices and display the operation of all types of DDC panels used by the system shall be included. Indicators and controls shall be installed in a control panel. Test jacks for input and output signal of the I/O simulator shall be front panel mounted for use in diagnostics and evaluation. The I/O functions mix, including indicators and controls, shall be at least:

#### 2.17.6 Communication Equipment, Wiring and Conduit

Provide all necessary data communication equipment, wiring, and conduit required for the transmission of data between the master control room, the SNs, and the DDC controllers as indicated. The communication equipment shall be provided with surge protection as required or recommended by SCS.

#### 2.18 DIRECT DIGITAL CONTROL PANEL SOFTWARE

Each DDC panel, shall contain an operating system that controls and schedules that DDC panel's activities in real time. The DDC panel shall maintain a point database in its RAM that includes all parameters, constraints, and the latest value or status of all points connected to that DDC panel. The operating system shall include a real time clock function that maintains the seconds, minutes, hours, date and month, including day of the week. The operating system shall allow local loading of software and data files from the portable tester and from an existing EMCS/UMCS operator interface panel.

##### 2.18.1 Command Priorities

A scheme of priority levels shall be provided to prevent interaction of a command of low priority with a command of higher priority. The system shall require the latest highest priority command addressed to a single point to be stored for a period of time longer than the longest time constraint in the on and off states, ensuring that the correct command will be issued when the time constraint is no longer in effect or report the rejected command. Override command entered by the operator shall have higher priority than those emanating from application programs.

##### 2.18.2 DDC Panel Startup

The DDC panel shall have startup software that causes automatic commencement of operation without human intervention, including startup of all connected I/O functions. A DDC panel restart program based on detection of power failure at the DDC panel shall be included in the DDC panel software. Upon restoration of power to the DDC panel, the program shall restart all equipment and restore all loads to the state at time of power failure, or to the state as commanded by time programs or other overriding programs. The restart program shall include start time delays between successive commands to prevent demand surges or overload trips. The startup software shall initiate operation of self-test diagnostic routines. Upon failure of the DDC panel and if the database and application software are no longer resident, or if the clock cannot be read, the DDC panel shall not restart and systems shall remain in the failure mode until the necessary repairs are made. If the database and application programs are resident, the DDC panel shall resume operation after an adjustable time delay of from 0 to 600 seconds. The startup sequence for each DDC panel shall include a unique time delay setting when system operation is initiated.

##### 2.18.3 DDC Panel Operating Mode

Each DDC panel shall control and monitor all functions independent of communication with any other source. The software shall perform DDC panel functions and DDC panel resident application programs using data obtained from I/O functions and based upon the DDC panel real time clock function. The DDC panel software shall execute commands after performing constraint checks in the DDC panel.

#### 2.18.4 DDC Panel Failure Mode

Upon failure for any reason, the system shall perform an orderly shutdown and force all DDC panel outputs to a predetermined state, consistent with the failure modes defined in the I/O summary tables and the associated controlled devices.

#### 2.18.5 DDC Panel Functions

Software necessary to accomplish the following functions, as appropriate, fully implemented and operational, within the DDC panel shall be provided:

- a. Scanning of inputs.
- b. Control of outputs.
- c. Store alarms for reporting when requested.
- d. Maintain real time.
- e. Execute DDC panel resident application programs.
- f. Averaging or filtering of each analog input.
- g. Constraint checks, prior to command issuance.
- h. DDC panel diagnostics.
- i. DDC panel portable tester operation.

#### 2.18.6 Analog Monitoring

The DDC panel shall measure analog values and shall be capable of transmitting analog values for display. An analog change in value is defined as a change exceeding a preset differential value as specified. Displays and reports shall express analog values in proper engineering units with polarity sign. The system shall accommodate up to 255 different sets of engineering unit conversions. Each engineering unit conversion shall include range, span, and conversion equation.

#### 2.18.7 Logic (Virtual) Points

Logic (virtual) points shall be software points entered in the point database which are not directly associated with a physical I/O function. This value shall be created by calculating it from any combination of digital and analog points, or other data. Logic points shall be analog or digital points having all the properties of real points, including alarms, without the associated hardware. Logic points shall be defined or calculated and entered into the database by the Contractor as required. The calculated analog point shall have point identification in the same format as any other analog point. The calculated point shall be used in any program where the real value is not

obtainable directly. Calculated point values shall be current for use by the system within 30 seconds of the time any input value changes and shall include:

- a. Control loop setpoints.
- b. Summer/winter operation.
- c. Real time.
- d. Scheduled on/off times.
- e. Equipment run-time targets.
- f. Calculated point values.

#### 2.18.8 I/O Point Definition

Each I/O point shall be defined in a database in the DDC panel. The definition shall include all physical parameters and constraints associated with each point.

#### 2.18.9 Parameter Definition

Each I/O point shall be defined and entered into the database by the Contractor, including as applicable:

- a. Name.
- b. Device or sensor type (i.e., sensor, control, motors).
- c. Point identifications number.
- d. Area.
- e. Sensor range.
- f. Controller range.
- g. Sensor span.
- h. Controller span.
- i. Engineering units conversion (scale factor).
- j. High and low reasonableness value (analog).
- k. High and low alarm limit (analog).
- l. High and low alarm limit differential (return to normal).
- m. Analog change differential (for reporting).
- n. High accumulator limit (pulse).
- o. Status description (digital inputs).

#### 2.18.10 Alarm Processing

Each DDC panel shall have alarm processing software for digital, analog, and pulse accumulator alarms for all input and virtual points connected to that DDC panel.

#### 2.18.10.1 Digital Alarms Definition

Digital alarms are those abnormal conditions indicated by digital inputs as specified in the I/O Summary Tables and elsewhere.

#### 2.18.10.2 Analog Alarms Definition

Analog alarms are those conditions higher or lower than a defined value, as measured by an analog input as specified in the I/O Summary Tables and elsewhere. Analog readings shall be compared to predefined high and low limits, and alarmed each time a value enters or returns from a limit condition. Unique high and low limits shall be assigned to each analog point in the system. Analog alarm limits shall be stored in the DDC panel database.

Each analog alarm limit shall have an associated unique limit differential specifying the amount by which a variable must return to the proper operating range before being declared as a return-to-normal state. Limits and differentials shall be entered on line by the operator in limits or the measured variable, without interruption or loss of monitoring of the point concerned.

#### 2.18.10.3 Pulse Accumulator Alarms Definition

Pulse accumulator alarms are those conditions calculated from totalized values of accumulator inputs or pulse accumulator inputs rates that are outside defined limits as specified in the I/O Summary Tables and elsewhere. Pulse accumulator totalized values shall be compared to predefined limits and alarmed each time a value enters a limit condition. Unique limits shall be assigned to each pulse accumulator point in the system. Limits shall be stored in the DDC panel database.

#### 2.18.10.4 Equipment Constraints Definitions

Each control point in the database shall have DDC panel resident constraints defined and entered by the Contractor, including as applicable:

- a. Minimum off time.
- b. Minimum on time.
- c. High limit (value in engineering units).
- d. Low limit (value in engineering units).

#### 2.18.10.5 Constraint Checks

Control devices connected to the system shall have the DDC panel memory resident constraints checked before each command is issued to ensure that no equipment damage will result from improper operation. Each command shall be executed by the DDC panel only after all constraint checks have been passed. Each command point shall have unique constraints assigned. High and low "reasonableness" values or one differential "rate-of-change" value shall be assigned to each analog input. Values outside the reasonableness limits shall be rejected and an alarm generated. Status changes and analog point values

shall be reported upon request, such as for reports, and application programs. Each individual point shall be capable of being selectively disabled by the operator. Disabling a point shall prohibit monitoring and automatic control of that point.

#### 2.18.11 DDC Panel Diagnostics

Each DDC panel shall have self-test diagnostic routines implemented in firmware. The tests shall include routines that exercise memory. Diagnostic software shall be provided for use in the portable tester. The software shall display messages in plain language to inform the tester's operator of diagnosed problems.

#### 2.18.12 Summer/Winter Operation Monitoring

The system shall provide software to change the operating parameters, monitoring of alarm limits, and start-stop schedules for each mechanical system where such a change from summer to winter and vice versa is meaningful. The software shall provide commands to application programs to coordinate summer or winter operation.

#### 2.18.13 Control Sequences and Control Loops

Operator commands shall be used to create and execute control sequences and control loops for automated control of equipment based on operational parameters including times and events, defined in the database. Through the existing EMCS/UMCS command entry device, the system shall prompt the operator for information necessary to create, modify, list, and delete control sequences and Proportional control loops. The system shall prompt the operator for confirmation that the control sequence and control loop addition/modification/deletion is correct, prior to placing it in operation. Mathematic functions required shall be available for use in creating the control sequences and control loops. Sufficient spare memory shall be provided to allow four control sequences and four control loops in addition to those necessary to implement the requirements specified for each DDC panel. Each control sequence shall accommodate up to eight terms or devices.

##### 2.18.13.1 Control Functions

The DDC panel shall provide the following control functions:

###### a. Proportional Control

The system shall not provide for PID control. The system shall provide Proportional control.

###### b. Reset Function

This function shall develop an analog output based on up to two analog inputs and one operator specified reset schedule.

##### 2.18.13.2 DDC Panel Resident Applications Software

Application software required to achieve the sequences of operation, parameters, constraints, and interlocks necessary to provide control of the systems connected to the DDC system shall be provided. Application software shall be resident and executing in the DDC panel, and shall be coordinated to ensure that no conflicts or contentions remain unresolved.



The following Optimum Start/Stop Program software shall be provided in addition to that required elsewhere:

HVAC equipment which is required to be started and stopped based on a time schedule shall be subject to this program. The program shall take into account the thermal characteristics of the structure, indoor and outdoor air conditions using prediction software to determine the minimum time of HVAC system operation needed to satisfy space environmental requirements at the start of the occupied cycle, and determine the earliest time for stopping equipment at the day's end without allowing the space environmental conditions to drift out of the range specified for the occupied cycle before the start of the unoccupied cycle.

#### 2.18.14 Communication Programs

The DDC panels shall be equipped with software drivers and handlers which allow for communication with the base-wide Staefa EMCS/UMCS. The software drivers shall allow for communications via modems, line drivers, transmitters/receivers over LAN, wirelines, fiber optic or coaxial cables as indicated. The software shall be structured to support communication over a network with star, ring, radial, or a combination of topologies. Each communication program module shall be functionally independent of other Contractor-furnished software, to allow for future upgrade or replacement of communication modules without affecting other application programs and other software modules. Communication protocol for communication shall conform to a standard Staefa Control System communication protocol.

### 2.19 DDC CONTROLLERS

#### 2.19.1 General

The direct digital control system shall consist of remote DDC Controllers. Each DDC controller shall operate as a stand alone controller capable of performing its specified control responsibilities whether in communicating mode or noncommunicating mode, independently of other controllers in the network. Each DDC controller shall be a microprocessor-based, multitasking, real-time digital control processor.

#### 2.19.2 Memory

Each DDC controller shall have sufficient memory to support its own operating system and data bases including:

- Control Processes
- Energy Management Applications
- Operator I/O (Portable Service Terminal)

#### 2.19.3 Portable Service Terminal (Smart II Tool) Compatibility

DDC Controllers shall directly support the use of existing Government-owned portable service terminals (Smart II Tools) . Providing portable service terminals is not required.

#### 2.19.4 Power Fail Protection

All system setpoints, proportional bands, control algorithms, and any other programmable parameters shall be stored such that a power failure of any duration does not necessitate reprogramming the controller.

#### 2.19.5 Application Descriptions

##### 2.19.5.1 Zone DDC Controller Hardware:

a. General: Each Zone DDC Controller shall be a stand-alone DDC controller. The controller shall include all hardware and software required for communications with the Staefa Net Controller. An individual DDC zone controller shall be dedicated for each zone terminal device (such as VAV, Fan Coil, or other zone device ). The zone controller is to be mounted remotely from the room sensor. Zone Controller which are wall mounted with integral room sensors are not acceptable since they would be subject to tampering by un-authorized personnel.

b. Programs: The control program shall reside in the zone controller. The application program shall be maintained in ROM. The default data base, ie. setpoints and configuration information, shall be stored in EEPROM. Controllers requiring local setting of potentiometers or dip switches are not acceptable.

c. Stand-Alone: Controllers requiring the application or data base to be downloaded from a host or share processing with a "master controller" shall not be acceptable. During a power failure the zone controller must run the application using the current setpoints and configuration.

d. Input/Output: Each controller shall have a minimum of eight inputs. Each input shall be usable as a discrete or 0-5 volt analog or digital input. Inputs shall be individually optically isolated from other inputs, outputs, communications, and power. All inputs shall feature an auto-calibrate function to eliminate sensing errors.

e. Each controller shall have a minimum of six digital outputs. Outputs shall be individually electrically isolated from the other outputs, inputs, communications and power. Controller shall be available with a minimum of two (2) analog outputs.

f. Connections: All electrical connections shall be made to the combination terminal strip and base assembly. To insure long term reliability, all electrical terminations shall be screw type. Modular telephone and other quick disconnect type wire connections are not acceptable.

g. The logic card, containing all active electrical components, shall be easily install able and removable from the wiring base, without the use of tools or the removal of any electrical wiring. Products that require disconnection of wiring from logic card before removal shall be provided with a quick disconnect type inter-connecting cable as supply transition to field wiring communications. Communication to the Staefa Net Controller shall be as a minimum 1200-baud synchronous. The Zone Controller shall be set by a hand-held digital service tool. All remaining parameters shall be set by this service tool, a laptop computer on the host computer.

##### 2.19.5.2 Zone DDC Controller Software:

a. VAV controller shall have the following capabilities:

1. DDC Control
2. Heating/Cooling Setpoint
3. Occupied & Unoccupied Setpoint Pairs
4. Dual Minimum Volume Control
5. Terminal Hydronic Heat Control
6. Auto-Calibrate
7. Remote Setpoint Adjust
8. Standby Mode

b. Fan Coil controller shall have the following capabilities:

1. DDC Control
2. Heating/Cooling Setpoint
3. Occupied & Unoccupied Setpoint Pairs
4. Hydronic Cooling
5. Hydronic Heating
6. Perimeter Heat Control
7. Single Speed, Multi-speed, or Proportional Speed Fan Control
8. Auto-Calibrate
9. OFF-Hours Tenant Override
10. Remote Setpoint Adjust
11. Standby Mode

#### 2.19.5.3 Local DDC Controller Hardware:

a. General: The Local DDC Controllers shall be local control loop microprocessor-based controllers used to make up the required DDC panels for AHUs, H&V units, etc. The controller shall execute local control sequences, independent of a workstation. All control loops and setpoints shall be stored in EEPROM or other non-volatile field reprogrammable memory. All controllers with volatile memory shall have a battery for 72 hour data base backup. Each controller shall be addressable by a workstation or a portable service tool.

b. Scan: Controllers shall continuously scan and maintain the most recent data in RAM for retrieval by a remote workstation and by the local DDC controller software programs.

c. Isolation: Control, communication, and power circuits for each controller shall be individually electrically isolated to protect against transients, spikes, and power surges. Each local Controller input and output shall be individually optically isolated from other inputs and outputs, power, communication, and field wiring. Optical isolation shall be provided either as an integral component of the controller or provided as a separate interface device between the controller and field wiring.

d. Servicing: Controllers shall consist of a removable plug-in circuit board. Products which require disconnection or wiring from the local controller logic card before removal shall be provided with a quick disconnect type interconnection to transition to field wiring.

e. Data base: All field control databases shall be entered, changed or downloaded to the local DDC controllers via a portable service tool or system workstation.

f. Auto-Calibration: All analog inputs shall feature an auto-calibrate function to eliminate sensing errors.

g. Input/Output Modules: Provide the following input/output capabilities:

1. Universal inputs which can accept industry standard analog signals (4-20 mA, 0-5 VDC, etc.) and binary contact closures.
2. All digital outputs may be latched or momentary contact type.
3. Analog outputs shall have a 1% resolution over total output span of 100%.

#### 2.19.5.4 Local DDC Controller Software:

a. General: Provide complete controller software to execute all mechanical system local loop controls functions.

b. Control Parameters: The software blocks in the local controller shall produce all of the necessary reverse acting and/or direct acting  $PI^2$  signals as required by the control sequence. The proportional and integral values which make up the  $PI^2$  output value shall be readable and modifiable, at the system workstation or the portable service terminal to facilitate tuning of control loops.

c. Networking: Each input, output, or calculation result shall be capable of being assigned to the Staefa Net Controller for system networking.

d. Programming Functions: Provide the following standard temperature control loop programming functions:

1. Control Block Programming
2.  $PI^2$  or PID Control
3. Serial Load Staging
4. Binary Load Staging
5. Analog Load Staging
6. Master-Submaster Routines
7. Anti-Windup for Integrated Loops

#### 2.19.6 Portable Service Tool

2.19.6.1 General: Provide a minimum of three (3) portable service tools with the system to allow commissioning, adjustment, and diagnosis of the zone and local controllers. If different types of portable service tools are required for programming of zone controllers versus local controllers, provide three (3) of each type. All programming shall utilize English language descriptors. Manufacturers which utilize portable service tools which require the User to translate HEX Decimal, Binary, or Numerical Syntax shall provide three (3) laptop computers with the hardware and software required to meet the specified programming capabilities.

a. The portable service tool shall have the following capabilities:

1. Readout of each input and output value in a real-time updated format for each point displayed.
2. Data base programming of input and output definitions, setpoints, and control parameters for setup and commissioning.
3. Manual override of all digital outputs, analog outputs, and application modes (occupied/unoccupied/standby) and control modes (heating/cooling/deadband). The service tool shall be capable of commanding these parameters to any override value as a override to local controller command.
4. Download of all stored data base parameters with a single keystroke for cloning typical controllers.

Calibrate all analog variables including terminal unit velocity (fpm or cfm), temperatures, pressure and other industry standard variables. The calibration shall be performed using a single "calibrate: key and inputing the new calibrated variable. All calibration data shall automatically be stored and retrieved by the controller, based only upon the new calibrated variable entered.

b. Connection of the service tool shall be made using a single quick install/release type connector. The connection shall be made at the controller, at the room temperature sensor, or at any point along the communications cable. A clip type service tool lead shall be supplied to provide versatility when connecting to the communications cable.

c. Once communication is established, menus shall be displayed to allow easy access to controller points. Points shall be physical inputs/outputs or logical functions within a controller.

d. A communication error counter function shall be provided by the service tool. When communication is established with a controller, the service tool shall count the number of communication errors encountered. This value shall be displayed by selection of the error count function.

e. A communication monitoring function shall also be provided. When in the communication monitor mode, the display shall present the command from the Network Controller and simultaneously present any successful reply from the Zone Controller or Local Controller.

f. The service tool shall be powered by a self contained, permanently installed, rechargeable battery pack. Fully charged batteries shall provide at least 10 hours of continuous operation. A battery charger shall be supplied to fully recharge the batteries within 16 hours. Continuous connection of the service tool to the charger shall be possible when the tool is in use or in storage.

## 2.20 CONTROLLER TEST BOARD

Provide 1 test board(s) which shall plug into the Zone Controller or Local Controller wiring subbase without the removal of any wiring. Switches shall be provided for testing all output field wiring and remote output devices. A set of meter test ports and rotary switches shall be provided to test all input signals.

## 2.21 DDC CONTROL PANELS AND DIGITAL INDICATOR SELECTORS

DDC panels shall be in accordance with \-NEMA ICS 6-\ NEMA 12 with lock and key. Each panel shall be provided with a door mounted digital indicator and selector switch which shall indicate the following by LED or LCD readout:

- a. Supply air temperature
- b. Return air temperature
- c. Mixed air temperature
- d. Outside air temperature

## 2.22 HVAC CONTROL PANELS

HVAC control panels shall be in accordance with \-NEMA ICS 6-\ NEMA 1 with lock and key.

## 2.23 WIRE AND CABLE

### 2.23.1 General

Wiring shall be specifically manufactured for the application for which it is used. Wiring installed in plenums shall be plenum rated or shall be run in conduit.

### 2.23.2 Digital Functions

Control wiring for digital functions shall be 18 AWG minimum with 600-volt insulation. Multiconductor wire shall have an outer jacket of polyvinyl chloride (PVC).

### 2.23.3 Analog (Output) Functions

Control wiring for analog functions shall be 18 AWG minimum with 600-volt insulation, twisted and shielded, 2-, 3-, or 4-wire to match analog function hardware. Multiconductor wire shall have an outer jacket of PVC.

### 2.23.4 Sensor Wiring (Analog Input Functions)

Sensor wiring shall be 20 AWG minimum twisted and shielded, two-, three-, or four-wire to match analog function hardware. Multiconductor wire shall have an outer jacket of PVC.

### 2.23.5 Class 2 Low Energy Conductors

The conductor sizes specified for digital and analog functions shall take precedence over any requirements for Class 2 low energy remote-controlled and signal-circuit conductors specified elsewhere.

## 2.24 \\*BTU MONITORING SYSTEM EQUIPMENT\*\

### 2.24.1 Sensor and Control Devices

#### 2.24.1.1 General

Primary flow measuring element shall be an in-line, vortex shedding type meter. The exact location and arrangement of pipe, upstream and downstream of the flow meter, shall be based on the manufacturer's published recommendations, requirements, and specifications. The flow meter shall be identified by a stainless steel tag indicating manufacturer, serial number, K-

factor and maximum output. Flow meter shall be equivalent in design and capability to the EMCO model Vortex PhD series.

Provide all remote sensors and instrumentation as required for the complete Btu monitoring system. All sensors shall be industrial grade and shall have accuracies as stated hereinafter. Hysteresis, relaxation time, span, maximum and minimum limits, shall also be accounted for in all applications of sensors and controls.

#### 2.24.1.2 Field Wiring

Field wiring for each sensor device shall be three conductor sized in accordance with Section: ELECTRICAL WORK, INTERIOR, solid copper, 300 volt, thermo-plastic twisted shielded instrumentation cable in conduit. All wires shall be terminated with pressure type connectors suitable for wire size and material as well as terminal connection.

2.24.1.3 NOT USED

2.24.1.4 NOT USED

2.24.1.5 NOT USED 2.24.1.6 NOT USED

#### 2.24.1.7 Vortex Shedding Type Meters

Meter shall be factory wet flow calibrated. Calibration information shall be supplied with each meter. Meter accuracy shall be +/- 0.7% of rate in liquid and repeatable to +/- 0.15% of flow rate. Meter shall be available for line sizes from 1 to 4 inches. Meter wing and shedder bar shall be constructed of stainless steel or carbon steel. Meter body shall be constructed of stainless steel. Meter shall have a completely sealed body cavity tested per ASME/ANSI B16.34. Meter shall have an operating temperature range of -40 to 750 degrees F.. Meter shall have a process pressure rating of ANSI Class 150#. Meter shall operate linearly within Reynolds numbers of 20,000 to 7,000,000.

##### 2.24.1.7.1 Meter Sensor

Meter shall use dual piezoelectric sensor for noise rejection. Sensor shall be removable without process shutdown or the requirement of bypass piping. Sensor shall be removable at process pressures of up to 750 psig.

##### 2.24.1.7.2 Meter Electronics

Electronics shall be suitable for integral or remote type mounting. electronics shall be equivalent in design and capability to EMCO's "EZ Logic" which enables the user to configure, diagnose and personalize each meter via a four-button keypad or magnet Wand without removing cover. flow rate and total shall be displayed in engineering units. electronics enclosure shall be NEMA 4 type. Meter shall have digital noise filter. Meter shall have analog 4-20 mA output, voltage pulse output and open collector FET output.

##### 2.24.1.7.3 Temperature Sensors (2-Required)

Temperature sensors shall be of the RTD type and shall be provided with 316 stainless steel wells with insertion length appropriate for the pipe size used. Sensor shall be provided with cast aluminum junction box for wiring terminations. Sensors shall be model TEM-30 as manufactured by EMCO or equal.

## 2.24.2 Sensor Selection

### 2.24.2.1 Flow Sensor Selection

Select the flow sensor to provide the accuracy stated for the output range from peak flow of 77 GPM for building 5220 and 108 GPM for building 5216 to one-fourth of the peak flow.

### 2.24.2.2 RTD Transmitters

The RTD transmitters shall be selected to match the resistance range of the RTD. The transmitter shall produce a linear 4 to 20 maDC output corresponding to the required temperature span. One delta-T transmitter may be provided with a 4 to 20maDC output for the delta-T temperature span of 0 to 50-degrees F. The output error shall not exceed 0.1 percent of calibrated span. The trans-mitter shall include offset and span adjustments unless the RTD element is integral to the transmitter and system calibration is provided.

## 2.25 \\*BTU COMPUTER\*\ (ie. Flow Processor)

The flow processor shall contain software capable of computing volumetric flow (actual or standard), mass flow and BTU usage for liquid. Processor must have 2 resettable and 2 non-resettable totalizer for user selected values. Processor shall have continuous diagnostics and displayed fault messages and shall be provided with a battery for backup protection of memory. Processor shall be capable of accepting an 8-point flow calibration for linearization and enhanced performance. Processor shall be able to display statistical values (ave., min., max.) for all flow variables, and temperatures. Processor shall have 16-key membrane keypad with tactile feedback. Processor shall be equipped with a 2-line x 16 character, alpha-numeric, LCD backlit display. Display shall illustrate flow values and engineering units on same screen. Display shall have both automatic or manual scanning of chosen flow values. Flow processor shall operate on 115 Vac, and shall produce the following outputs:

Power: 24 Vdc +/- 5% at 15 mA  
Analog: isolated 4-20 mA dc  
Relay: isolated solid state with AC or DC option

Flow processor shall have an operating temperature range of 32 to 122 degrees F.. Flow processor shall be provided in a NEMA 4 enclosure. Flow processor shall be equivalent in design and capability to the EMCO model FP-93.

## PART 3 EXECUTION

### 3.1 GENERAL INSTALLATION CRITERIA

#### 3.1.1 HVAC Control System

All components and appurtenances shall be installed by Staefa Control System, Inc. (SCS) or by certified subcontractors of SCS in accordance with manufacturer instructions and as shown or specified. All necessary interconnections, services, and adjustments required for interface to the Base EMCS shall be furnished. All electrical work shall be in accordance with Section \=16415=\ ELECTRICAL WORK, INTERIOR. Instrumentation grounding shall be provided as necessary to preclude ground loops and noise from adversely affecting equipment operations.



The HVAC control system shall be completely installed and ready for operation.

Dielectric isolation shall be provided where dissimilar metals are used for connection and support. Penetrations through and mounting holes in the building exterior shall be made watertight. The HVAC control system installation shall provide clearance for control system maintenance by maintaining access space between coils, access space to mixed-air plenums, and other access space required to calibrate, remove, repair, or replace control system devices. The control system installation shall not interfere with the clearance requirements for mechanical and electrical system maintenance.

#### 3.1.2 Software Installation

Software shall be loaded for an operational system, including databases for all points, operational parameters, and system, command, and application software. The Contractor shall provide original and backup copies of source, excluding the general purpose operating systems and utility programs furnished by computer manufacturers and the non-job-specific proprietary code furnished by the system manufacturer, and object modules for all software on each type of media utilized, within 30 days of formal Government acceptance. In addition, a copy of individual floppy disks of all software for each DDC panel shall be provided.

#### 3.1.3 Device-Mounting Criteria

Devices mounted in or on piping or ductwork, on building surfaces, in mechanical/electrical spaces, or in occupied space ceilings shall be installed in accordance with manufacturer's recommendations and as shown. Control devices to be installed in piping and ductwork shall be provided with all required gaskets, flanges, thermal compounds, insulation, piping, fittings, and manual valves for shutoff, equalization, purging, and calibration. Strap-on temperature sensing elements shall not be used except as specified.

#### 3.1.4 Wiring Criteria

Wiring external to control panels, including low-voltage wiring, shall be installed in metallic raceways. Wiring shall be installed without splices between control devices and DDC panels. Instrumentation grounding shall be installed as necessary to prevent ground loops, noise, and surges from adversely affecting operation of the system. Cables and conductor wires shall be tagged at both ends, with the identifier shown on the shop drawings, in accordance with the requirements of Section \=16415=\ ELECTRICAL WORK, INTERIOR. Other electrical work shall be as specified in Section \=16415=\ ELECTRICAL WORK, INTERIOR and as shown.

### 3.2 CONTROL-SYSTEM INSTALLATION

#### 3.2.1 Damper Actuators

Actuators shall not be mounted in the air stream. Multiple actuators operating a common damper shall be connected to a common drive shaft. Actuators shall be installed so that their action shall seal the damper to the extent required to maintain leakage at or below the specified rate and shall move the blades smoothly.

#### 3.2.2 NOT USED

#### 3.2.3 Room-Instrument Mounting

Room instruments shall be mounted so that their sensing elements are above the finished floor unless otherwise indicated.

#### 3.2.4 Freezestats (Low Limit Temperature (Freeze Thermostat) Automatic Fan Shutdown)

Low-limit temperature cutoff with manual reset shall be provided for each air handling system as indicated and shall be set to stop the fan and close the outside air damper if the mixed air temperature approaching the cooling coil drops below 36 degrees F. The sensing element shall be not less than 20 feet long, and shall be installed to sense representative temperatures across the entire coil face, responding to shut off the fan if any 12-inch portion of the 20-foot element minimum of three loops is exposed to an air temperature below 36 degrees F. The accuracy of the thermostat shall be +1 degrees F. Thermostat shall be filled with R-134a. Units shall have two (2) sets of snap-action contacts with simultaneous operation. One set shall be used for connection to the direct digital control system. For each 20 square feet of coil-face area, or fraction thereof, a freezestat shall be provided to sense the temperature at the location indicated on HVAC control drawings. Manual reset freezestats shall be installed in approved, accessible locations where they can be reset easily. The freezestat sensing element shall be installed in a serpentine pattern.

#### 3.2.5 Averaging-Temperature Sensing Elements

Sensing elements shall have a total element minimum length equal to 1 linear foot per square foot of duct cross-sectional area.

3.2.6 NOT USED

3.2.7 NOT USED

3.2.8 NOT USED

#### 3.2.9 Indication Devices Installed in Piping and Liquid Systems

Gauges in piping systems subject to pulsation shall have snubbers. Thermometers and temperature sensing elements installed in liquid systems shall be installed in thermowells.

### 3.3 CONTROL SEQUENCES OF OPERATION

#### 3.3.1 General Requirements - HVAC System

The sequence of operation shall be created/designed and provided by the Contractor on the control drawings. The technical requirements in Section 1006 shall be met through the sequence of control that the Contractor creates/designs. The Control sequence shall address and include each controlled component in each of the HVAC systems.

### 3.4 COMMISSIONING PROCEDURES

#### 3.4.1 Control Systems Evaluations

The Contractor shall make the observations, adjustments, calibrations, measurements, and tests of the control systems, set the time schedule, and make any necessary control-system corrections to ensure that the systems function as described in the sequence of operation. The commissioning shall be created/designed and provided by the Contractor on the contract drawings. The following subparagraphs are NOT the commissioning for this facility, but

rather serve as an illustrative example of the detail that is required for the commissioning that the Contractor is to provide for this facility.

#### 3.4.1.1 Item Check

Signal levels shall be recorded for the extreme positions of each controlled device. An item-by-item check of the sequence of operation requirement shall be performed using Steps 1 through 4 in the specified control system commissioning procedures. Steps 1, 2, and 3 shall be performed with the HVAC system shut down; Step 4 shall be performed after the HVAC systems have been started. External input signals to the DDC panel (such as starter auxiliary contacts, and external systems) may be simulated in steps 1, 2, and 3. With each operational-mode signal change, DDC panel output relay contacts shall be observed to ensure that they function.

#### 3.4.1.2 Weather-Dependent Test Procedures

Weather-dependent test procedures that cannot be performed by simulation shall be performed in the appropriate climatic season. When simulation is used, the actual results shall be verified in the appropriate season.

#### 3.4.1.3 Sequence of Operation Requirements

An item-by-item check of the Sequence of Operation requirements shall be performed using Steps 1 through 4 of these instructions. Operational mode change signals shall originate from the actual control device intended for the purpose. External input signals to the DDC panels, such as starter auxiliary contacts, and external systems, may be simulated in Steps 1, 2, and 3.

#### 3.4.1.4 Two-Point Accuracy Check (HVAC Control System Sensor)

A two-point accuracy check of the calibration of each HVAC control system sensing element and transmitter shall be performed by comparing the DDC panel readout to the actual value of the variable measured at the sensing element and transmitter. Digital indicating test instruments shall be used, such as digital thermometers, motor-driven psychrometers, and tachometers. The test instruments shall be at least twice as accurate as the specified sensing element-to-DDC panel readout accuracy. The calibration of the test instruments shall be traceable to National Institute Of Standards And Technology standards. The first check point shall be with the HVAC system in the shutdown condition, and the second check point shall be with the HVAC system in an operational condition. Calibration checks shall verify that the sensing element-to-DDC panel readout accuracies at two points are within the specified product accuracy tolerances. If not, the device shall be recalibrated or replaced and the calibration check repeated.

#### 3.4.1.5 Insertion and Immersion Temperature (Sensors)

Insertion temperature and immersion temperature sensing elements and transmitter-to-DDC panel readout calibration accuracy shall be checked at one physical location along the axis of the sensing element.

#### 3.4.1.6 Averaging Temperature (Readout Calibration Averaging)

Averaging-temperature sensing element and transmitter-to-DDC panel readout calibration accuracy shall be checked every 2 feet along the axis of the sensing element in the proximity of the sensing element, for a maximum of 10 readings. These readings shall then be averaged.

#### 3.4.1.7 Manual Inputs

Contractor shall use manual inputs to the DDC panel as the means of manipulating control devices such as dampers and valves to effect stable conditions prior to making measurement checks.

#### 3.4.2 Grounding

Grounding shall be in accordance with \-ANSI C2-\ . All ground wire shall be copper.

#### 3.4.3 NOT USED

#### 3.4.4 Unit Heater and Cabinet Unit Heater

The "OFF/AUTO" switch shall be placed in the "OFF" position. Each space-thermostat temperature setting shall be turned up so that it makes contact and turns on the unit heater fans. The unit heater fans shall not start. The "OFF/AUTO" switch shall be placed in the "AUTO" position. It shall be ensured that the unit-heater fans start. Each space thermostat temperature setting shall be turned down, and the unit-heater fans shall stop. The thermostats shall be set at their temperature setpoints. The results of testing of one of each type of unit shall be logged.

#### 3.4.5 NOT USED

#### 3.4.6 NOT USED

#### 3.4.7 NOT USED

#### 3.4.8 Hydronic-Heating with MTHW/Hot Water Convertor

Installation shall be as follows:

a. Step 1 - System Inspection: The HVAC system shall be observed in its shutdown condition. Power and main air shall be available where required. The converter valve shall be closed.

b. Step 2 - Calibration Accuracy Check with HVAC System Shutdown: Readings shall be taken with a digital thermometer at each temperature sensing element location. Each temperature shall be read at the DDC panel, and the thermometer and DDC panel readings logged. The calibration accuracy of the sensing element-to-DDC panel readout for outside air temperature and system-supply temperature shall be checked.

c. Step 3 - Actuator Range Adjustments: A signal shall be applied to the actuator, through an operator entered value to the DDC panel. The proper operation of the actuators and positions for all valves shall be verified. The signal shall be varied from live zero to full range, and it shall be verified that the actuators travel from zero stroke to full stroke within the signal range. It shall be verified that all sequenced actuators move from zero stroke to full stroke in the proper direction and move the connected device in the proper direction from one extreme position to the other.

d. Step 4 - Control-System Commissioning:

(1) The two-point calibration sensing element-to-DDC panel readout accuracy check for the outside air temperature shall be performed. Any

necessary software adjustments to setpoints or parameters shall be made to achieve the outside air temperature schedule.

(2) A signal shall be applied to simulate that the outside air temperature is above the setpoint. It shall be verified that pump P-3 and P-4 stops. A signal shall be applied to simulate that the outside air temperature is below the setpoint. It shall be verified that pump P-3 and P-4 starts.

(3) The two-point calibration accuracy check of the sensing element-to-DDC panel readout for the system supply temperature shall be performed. The system supply temperature setpoint shall be set for the temperature schedule as shown. Signals of 8 ma and 16 ma shall be sent to the DDC panel from the outside air temperature sensor, to verify that the supply temperature setpoint changes to the appropriate values.

(4) The system shall be placed in the occupied mode. The calibration accuracy check of sensing element-to-DDC panel readout for each space temperature, shall be performed and the values logged. The space temperature setpoint shall be set for 70 degrees F at midrange, 55 degrees F at the low end, and 85 degrees F at the high end. The system shall be placed in the unoccupied mode, and it shall be verified that the space temperature setpoint changes to the unoccupied mode setting.

3.4.9 NOT USED  
3.4.10 NOT USED  
3.4.11 NOT USED  
3.4.12 NOT USED  
3.4.13 NOT USED

3.4.14 Heating and Ventilating Unit

Steps for installation are as follows:

a. Step 1 - System Inspection: The HVAC system shall be observed in its shutdown condition. The system shall be checked to see that power and main air are available where required, the outside air damper and relief air damper are closed.

b. Step 2 - Calibration Accuracy Check with HVAC System Shutdown: Readings shall be taken with a digital thermometer at each temperature-sensing element location. Each temperature shall be read at the DDC panel, and the thermometer and DDC panel readings logged. The calibration accuracy of the sensing element-to-DDC panel readout for space temperature shall be checked.

c. Step 3 - Actuator Range Adjustments: A signal shall be applied to the actuator through an operator entered value at the DDC panel. The proper operation of the actuators for all dampers and valves shall be verified. The signal shall be varied from live zero to full range, and that the actuators travel from zero stroke to full stroke within the signal range shall be verified. It shall be verified that all sequenced and parallel-operated actuators move from zero stroke to full stroke in the proper direction, and move the connected device in the proper direction from one extreme position to the other.

d. Step 4 - Control-System Commissioning:

(1) With the fan ready to start, the system shall be placed in the heating mode through operator entered values. It shall be verified that supply fan starts. It shall be verified that the outside air and relief air dampers are closed, and the heating coil valve is under control, by artificially changing the space temperature through operator entered values.

(2) The system shall be placed in the economizer mode. It shall be verified that the outside air and relief air dampers open.

(3) The calibration accuracy check for sensing element-to-DDC panel readout for the space temperature shall be performed. The discharge temperature setpoint shall be set for 68 degrees F. Proper operation of the temperature setpoint device at the space temperature sensing element and transmitter location shall be verified. The temperature setpoint device shall be set to the space temperature setpoint as shown.

(4) With the HVAC system running, a filter differential pressure switch input signal shall be simulated, at the device. It shall be verified that the filter alarm is initiated. The differential-pressure switch shall be set at the setpoint.

(5) With the HVAC system running, a freezestat trip input signal shall be simulated, at the device. HVAC system shutdown shall be verified. It shall be verified that a low temperature alarm is initiated. The freezestat shall be set at the setpoint. The HVAC system shall be restarted by manual restart and it shall be verified that the alarm returns to normal.

(6) With the HVAC system running, a smoke-detector trip input signal shall be simulated at each detector, and verification of control device actions and interlock functions as described in the Sequence of Operation shall be made. Simulation shall be performed without false alarming any Life Safety systems. It shall be verified that the HVAC system shuts down and that the smoke detector alarm is initiated. The detectors shall be reset. The HVAC system shall be restarted by manual reset, and it shall be verified that the alarm signal is changed to a return-to-normal signal.

### 3.5 BTU MONITORING SYSTEM INSTALLATION

#### 3.5.1 Sensors and Control Devices

3.5.1.1 Provide a building Btu monitor and terminal wiring panel with wiring terminal blocks. Each electrical field wire shall be labeled or coded at each end to show location of the opposite end. Each point of all field terminal strips shall be permanently labeled or coded to show the instrument or item served. Color coded cable with cable diagrams may be used to accomplish cable identification and terminal strip identification.

#### 3.5.2 Resistance Temperature Detector (RTD)

Each RTD shall be stabilized to such a degree as to permit on-the-job installation that will require minimum field adjustment or calibration. RTD assemblies shall be readily accessible and adaptable to each type of application in such a manner as to allow for quick, easy replacement and servicing without special tools or skills. Each water temperature RTD shall be in a well.

#### 3.5.3 BTU Monitors

Install all equipment in accordance with manufacturer's published instructions. Btu monitors shall be in dry interior area of building. Do not install panels adjacent to heat generating devices.

### 3.6 BTU MONITORING SYSTEM FIELD TESTS AND INSPECTIONS

Upon completion of installation of each piece of equipment, field inspect and mechanically and electrically test equipment for proper function. The Contracting Officer may witness the test. Submit a certification to the Contracting Officer that each piece of equipment has been field inspected and tested for proper function prior to final system test.

#### 3.6.1 Preliminary Tests

Conduct a controlled test using signal generators (0 to 24maDC capability) to verify the accuracy and stability of the computer calculations and software as follows:

#### 3.6.2 Threshold Test

Threshold is defined as the input value where the computer (because of low or high signal level) assumes a fixed minimum or maximum input value.

##### 3.6.2.1 Flow Threshold

Starting with flow and delta-T inputs of 12maDC, decrease and then increase the flow input until the flow thresholds have been determined.

##### 3.6.2.2 Temperature Threshold

Starting with flow and delta-T inputs of 12maDC, decrease and then increase the delta-T input until the flow thresholds have been determined.

##### 3.6.2.3 Threshold Stability

With the flow input set at 0.1maDC above the low and then 0.1maDC below the high threshold, decrease and then increase the delta-T input below and then above the delta-T low and high thresholds and verify stability of the computer output. With the delta-T input set at 0.1maDC above the low and then 0.1maDC below the high thresholds, decrease and then increase the flow input below and then above the flow low and high thresholds and verify stability of the computer output.

##### 3.6.2.4 Interval Timing

Each of the tests shall be of sufficient length of time to permit a minimum of 10 calculations in the computer.

#### 3.6.3 Operational Test

A final test shall be conducted with all BTU Meter components operating in their normal mode, but with control override of the HTHW control valve. The control signal to the HTHW control valve shall be manually adjusted to check BTU Meter operation, as a minimum, at 0, 50, and 100 percent open. Each test shall be conducted for a minimum of 10-minutes while monitoring and recording the flow and delta\_T transmitter output currents to the BTU computer. Manual calculations, using technical data on flow and temperature sensors and transmitters, shall be conducted to compare actual to BTU computer results.

Note: It will be necessary to observe the secondary water temperature to ensure it does not exceed 200-degrees F when conducting the 50 and 100 percent flow tests. Test will be ended if the 200-degrees F is exceeded. It may be necessary to allow secondary to cool down prior the higher flow testing to permit adequate time for the test.

#### 3.6.4 Operational Test

A final test shall be conducted with all BTU Meter components operating in their normal mode. Each test shall be conducted for a minimum of 10 minutes while monitoring and recording the flow and delta-T transmitter output currents to the BTU computer. Test at full pump flow and with pumps off. Manual calculations, using technical data on flow and temperature sensors and transmitters, shall be conducted to compare actual to BTU computer results.

#### 3.6.5 Test Plan

A Preliminary and Operational test plan shall be submitted for approval at least 14 days prior to BTU monitoring system testing.



## **ATTACHMENT NO. 4**

# **INTERIOR GUIDELINES & CID FURNITURE REQUIREMENTS FOR CONTROL TOWER AT USAFA, COLORADO**

# INTERIOR GUIDELINES

DEVELOP

UNITED STATES AIR FORCE ACADEMY BASE COMPREHENSIVE PLAN

# USAF

# ACADEMY OBJECTIVES

The original interior spaces of the Cadet Area buildings have proven to be functional, flexible, and aesthetic. Any changes or additions to this original design must contribute to the well established and well accepted character of the interiors. Changes or additions to the Support Areas must strive to transcend accepted norms for support spaces. The five general guideline objectives that must be met by each new project within the Academy are:

1. Continuity,
2. Compatibility,
3. Appropriate Technology,
4. Creativity
5. Durability

## Continuity

All projects must ensure the uninterrupted extension of the interiors functional organizational patterns and sequences. New functions and uses, and the expansion or redevelopment of existing functions must be in harmony with the design goals established in this document.

## Compatibility

All projects must contribute to the goal of visually harmonious interiors. New development or redevelopment must be planned and designed to be perceived as an integral component within each building type, which in turn contributes to the entire homogenous complex.

## Appropriate Technology

All projects must continue the search for appropriate uses of current state-of-the-art developments in materials and technology. Changing technology, communications, materials availability, and social-economic forces including energy considerations create the need to advance and improve interior building systems. All systems, built and freestanding, must anticipate and accommodate flexibility in the ever-changing work environment.

## Creativity

All projects must seek to contribute to the Academy's interior architecture both aesthetically and functionally.

New programs and requirements will require interior solutions that are creative yet stay within

the boundaries established by these guidelines. While individualizing personal space is acknowledged, these spaces must conform to the guidelines set for the entire Academy. Government provided fixtures that are permanent are not subject to personal taste. All work at the Academy must recognize the value of creative thought and its difference from superficial consideration. The goals, ultimately, are well reasoned solutions mindful of the opportunity afforded by new technologies and materials but sensitive to the context of the Academy and its mission. *These solutions are not to be mere application of currently acceptable styles, trends, or expedient responses.*

00010

# INTRODUCTION

The United States Air Force Academy is a unique institution, both in the importance of its mission and in the quality of its physical design. It trains the future leaders of the Air Force and is a renowned architectural achievement, recognized as a monument to coherent planning and meticulous design.

The architecture of the United States Air Force Academy is as forceful and coherent today as when it was first designed 35 years ago. It is identifiable as modern yet the level of detail and quality of thought expressed in its design achieves buildings of a character that transcends style. Adherence to carefully defined planning and architectural guidelines have helped to maintain this character.

An integral component of the Academy's architecture is the relationship of exterior expression to interior spaces. While much effort has been expended over the years to maintain the exterior of the buildings, protecting the integrity of the interior spaces has not yet received similar attention. The purpose of this particular document is to provide guidance for any future change or refurbishment of all interior spaces within the Academy as described in these guidelines.

- The goal of the Cadet Area guidelines is to preserve the basic design concept and detailing for both the exterior and interior of the buildings, recognizing the importance of the Academy as a historical landmark and architectural monument. Care must be taken, however, not to recreate 1950's interiors but to create up to date interiors.

- The goal of the Community Center, service supply area, hospital, and airfield guidelines is to continue the basic design principles set forth in the Cadet Area, while executing these standards in a finish level appropriate to each area.

All who participate in the functioning of the Academy have a responsibility to ensure that the high standards set forth from the earliest days of the Academy both to achieve its mission and to maintain the quality and integrity of its physical environment are met and perpetuated.

Any work done to the Carlton House shall be approved by the civil engineering department and the State Historic Preservation Office.

This document is divided into four sections: interior planning guidelines, interior spatial

guidelines, material finishes and implementation. The first section establishes the overall concepts or "big picture" which provides the foundation for the goals of the Academy. The second interior section sets out the generic rules for each functional area. The third section details the specific finishes appropriate to each functional area. It should be noted that sections two and three have been further separated into subcategories:

- The Cadet Area and its associated buildings.
- Support Areas which include the Community Center, Service/Supply Area, hospital, miscellaneous office space, Officer's Club/VOO area.

- General areas which are functional types and design issues pertinent to every interior environment at the Academy.

The fourth and final section of this document outlines a methodology for adherence to these guidelines.

# GUIDELINES SUMMARY

## Interior Planning Guidelines

Interior planning guidelines establish the broad concepts governing the overall approach to interior spaces in the Academy. Essentially, they are principles of organization to which work in individual buildings and spaces shall adhere. This broad framework provides coherence by reaffirming the basic design principles found in the Cadet Area and to be followed in all buildings throughout the Academy. The following is a summary of these guidelines:

1. Maintain a strong relationship to the building architecture in plan, section, and design philosophy.
2. Use of 28 ft. governing grid for all plan considerations.
3. Create interior spaces that are simple, regular, and rectangular in form.
4. Maintain major circulation corridors along the primary axis of the building architecture.
5. Maintain the importance of natural light in all major circulation paths and office space.

Views to the natural landscape are desirable.

6. Provide a clear understanding of circulation both vertically and horizontally.
7. Create major and minor spaces which will help establish focus, attention, and orientation.
8. Group similar functions together. Separate dissimilar functions by either building or floor.
9. Provide equitable distribution of space based on function and hierarchy.
10. Maintain a building plan that reflects the importance of flexibility of use, present and future.
11. Duplicate original detailing.

## Interior Spatial Guidelines

Interior Spatial Guidelines provide the design rules for interior spaces broken down by each functional category within the Cadet Area, Support Areas, and General Areas that are

typical to the Academy.

## Finish Guidelines

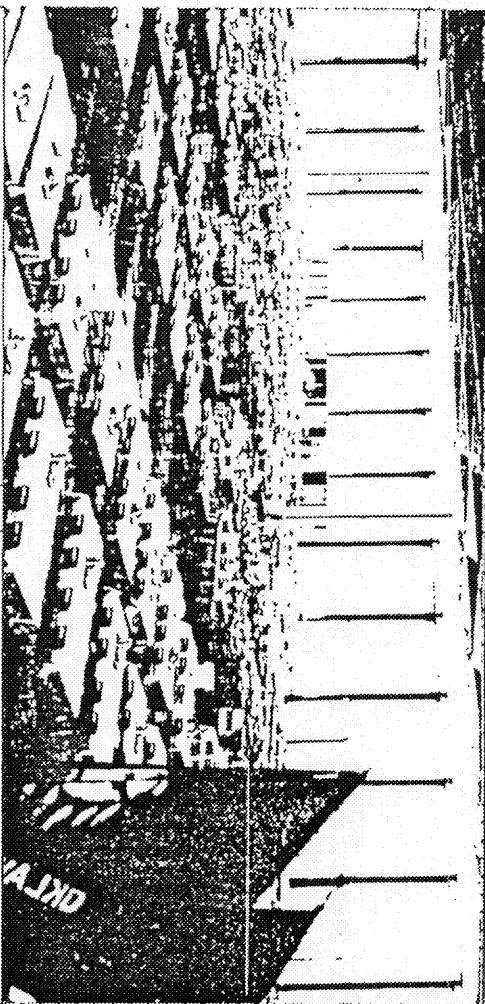
This is a listing of specific materials and finishes to be used in each functional category within the Cadet Area, Support Areas, and General Areas typical to the Academy.

## Implementation

This section outlines a methodology for adherence to the guidelines.

00006

718 Mitchell Hall Dining Room



reception area. The panelization for both walls shall match or complement each other and conform to the dimension on the overriding governing grid.

The ceiling is to remain the original space frame.

A reception desk must be added to the reception area. The front face and top cap of the desk shall be back painted glass with stainless steel trim. The work surface shall be a solid surfacing material. The desk is to be located in a logical place in the reception area and be of a color complementary to the other colors in the room.

Main level service wall

In order to achieve some variety and interest

along the main level service wall a panelized opaque system should be applied to the wall. The panels shall be separated by a 3/8" reveal and have a recessed base in a height to match the rest of the dining hall. All doors on the service wall must be incorporated so they appear as if they are part of the panelized wall system. The panelization must conform to the governing grid and coordinate with the staff tower wall in order to achieve a unity between both wall planes.

Cadet Chapel

The interiors of the Cadet Chapel currently exists as a modern, timeless, architectural statement. Every effort shall be made to maintain this area in its original state. No work shall be done in this area unless it has received prior approval from

the HQ USAFA/DEPC and Skidmore, Owings & Merrill.

### SUPPORT AREAS

The design principles outlined in this section are part of a unified design philosophy and are consistent throughout the Academy. The Support Areas, which include the Community Center, Service Supply Area, hospital, miscellaneous office space and the officer's club/VOO area, should also conform to the design principles modified here according to function and administrative hierarchy.

### Building Lobbies

#### Floors

Flooring in lobbies and entries of the Support Areas shall be of a hard material and should be in a pattern compatible with the overall governing grid of the building. Public buildings and large lobbies shall consider the use of accent banding of the hard flooring. The dimension of the banding shall be proportional to the dimensions of the space and shall emphasize the overall governing grid of the building, similar to the Cadet Area.

#### Walls

00028

The walls in the building entries shall read as planes. The planes shall serve as the primary focus of the entry space and be of a uniformly colored ceramic tile with a 3/4" extruded aluminum reveal at the head and 3/8" reveals at the sides. Individual colors shall be used to designate entries of different building types such as dorms and retail space.



CORRIDOR SIDE

CEILING TILE

7.19 — Reflected ceiling plan at transition between lobby and circulation corridor

7.20 — Plan at transition between lobby and circulation corridor

GYPSUM WALL BOARD

LOBBY SIDE

CORRIDOR SIDE

CARPET

GYPSUM WALL BOARD REVEAL

FABRIC PANEL

LOBBY SIDE

HARD FLOORING

00029

7.20

All walls of upgraded public building lobbies shall have a 4" recessed base, except the ceramic tile walls. Walls in general support building lobbies are to be colored planes, uniform in color and finish, with a 3/4" reveal at the head and an applied base.

Transitions should occur between the building lobby and adjacent functions to provide a logical termination for the lobby finishes. Typically, these transitions shall be full height with a drywall head and hard floor. Vertical reveals shall serve as the juncture point of dissimilar materials. The depth of these transitions shall be compatible with the architecture of the surrounding environment.

#### Ceilings

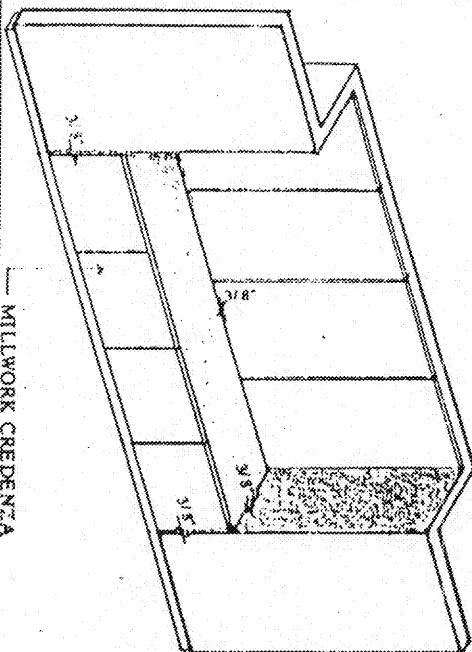
Ceilings are to be of a uniform material with light fixtures located in a logical pattern and placement in relation to the governing grid. Light fixtures shall also relate to any vertical panelization on the walls by either aligning with the center line or with the joint of the vertical panel.

Upgraded public building lobbies shall have either a glue-in application of 12" x 12" concealed spline MFT or drywall ceilings with downlights. General support building lobbies shall have 2' x 2' suspended MFT ceilings with 2' x 2' fluorescent light fixtures.

#### Stairways

Floors, walls, and ceilings of stairways shall conform with the guidelines of the rest of the lobby. Ornamental stairways shall be similar to open stairways as described in the Cadet Area Interior Spatial Guidelines.

2.21 Typical millwork reveals



MILLWORK CRENZZA

#### Primary and Secondary Circulation Corridors

Circulation corridors should read as expressions of planes in both the floor and the ceiling.

#### Floors

The floor shall be a monolithic material typically of one color. Large circulation corridors may introduce accent banding of the same material corresponding to the governing grid and door placement in the corridor.

#### Base

The base shall be 4" high rubber base, either recessed or applied, depending on the finish level and public access of corridor.

#### Walls

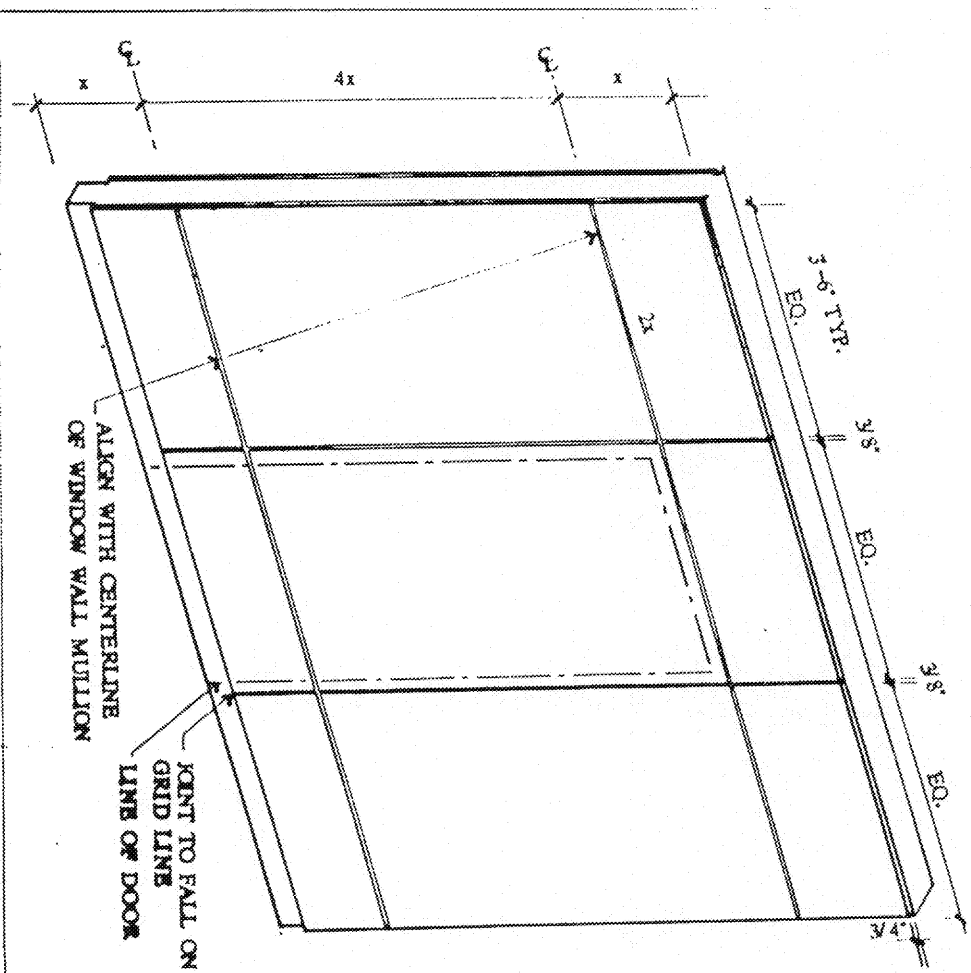
The walls shall be of a continuous monolithic material of a light color. In all circulation corridors, corners shall have continuous metal corner guards extending from the top of the base to the bottom of the head. This corner guard is not to exceed 2" and shall be metal painted to match the wall. Openings between primary and secondary circulation are to extend full height from floor to ceiling.

#### Doors

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Door planes generally shall extend full height from floor to ceiling. Doors are to be 8'-0" high and of a solid material with painted metal frames. Transoms are to be in same plane as the door. As doorways are a point of entry, they must be at





00031

color which extends from frame to frame. Door colors are to be pure in tone and relate to the color already indigenous in that particular building as introduced in the building lobby. Upgraded areas are to have wood veneer doors and transoms to match the Cadet Area existing veneer with black painted metal frames. The species and color for the wood should be compatible with the original veneer.

As doors read as planes they shall remain solid in appearance. Glass in doors is not appropriate to the original design intent. Glass doors, however, may be used for prominent entries. Glass sidelites may be used where necessary. Should a glass door extend across a corridor, the entire plane must be glass. The glass in these doors and sidelites shall be clear with minimal style in a clear anodized aluminum or stainless steel finish. The dimension of door frames is not to exceed 2 1/2". Louvers and vents in doors, when required, shall be centered on the door, located at the lower portion of the door and must not exceed 2'-0" above the floor. They shall be painted to match the color of the door. Louvers and vents in veneer doors shall be in a finish to match the frame. Push plates and kick plates may be used where required. Push plates shall be stainless steel and kickplates shall be painted to match the door.

If a door opening cannot extend full height, due to high ceiling heights, the door height shall relate in a logical manner to the rest of the interior surroundings.

Miscellaneous openings are to be full height, if possible, or correspond in height to their

surroundings, aligning with either the horizontal mullions of the perimeter window wall or the 8'-0" door height. The width of such openings shall conform to the governing grid and to the panel height and width if they occur in panelized walls.

#### Ceilings

Ceilings are to read as a plane of a single material appropriate to the finish level of the corridor and be of consistent height. Dropped ceilings and soffits are to be avoided. Light fixtures shall be flush with the ceiling with individual fixtures being centered in the corridor in a logical pattern.

#### Administration Spaces

Administrative spaces, in general, shall be comprised of primarily open office areas supported by enclosed conferencing areas. The quantity of private offices must be limited in order to maintain an office environment that is flexible.

#### Floors

The flooring within all administrative offices is to be a carpet in a color and texture appropriate to the office's function and administrative hierarchy. The carpet shall be installed with a direct glue application with upgraded areas being installed over pad.

For functional purposes, some general office areas are best served with hard flooring. When this occurs, the floor shall be monolithic material of one color.

#### Walls

Walls are to be of a single material of one color. Standard walls shall be comprised of an applied straight rubber base and a hard wall surface painted.

Upgraded walls shall be comprised of a recessed rubber or wood base, with the walls being fabric panels or wood veneer panels extending from the top of the base to the ceiling. The panels shall extend the entire length of the wall, and align with or relate to the grid. Doors in panelized walls are to be compatible with the width and height of the panels. Fabric panels shall be but jointed or separated by a 3/8" reveal and be of a color complementary to the color on that floor. Wood veneer panels shall be separated by a 3/8" reveal, with a 3/4" reveal at the head, bookmatched, and of a species and color compatible with the existing veneer finish. Wood grain plastic laminate, wall covering or residential grade paneling are not acceptable.

The ceilings in typical administrative spaces shall be a suspended 2' x 2' rectangular grid system. The suspended system is to meet the wall plane with the manufacturer's standard channel. 2' x 2' fluorescent fixtures are to be located within the suspended ceiling in a uniform and functional pattern.

Upgraded ceilings are to have recessed downlights and wall washers located in the center of a 1' x 1' ceiling tile or drywall.

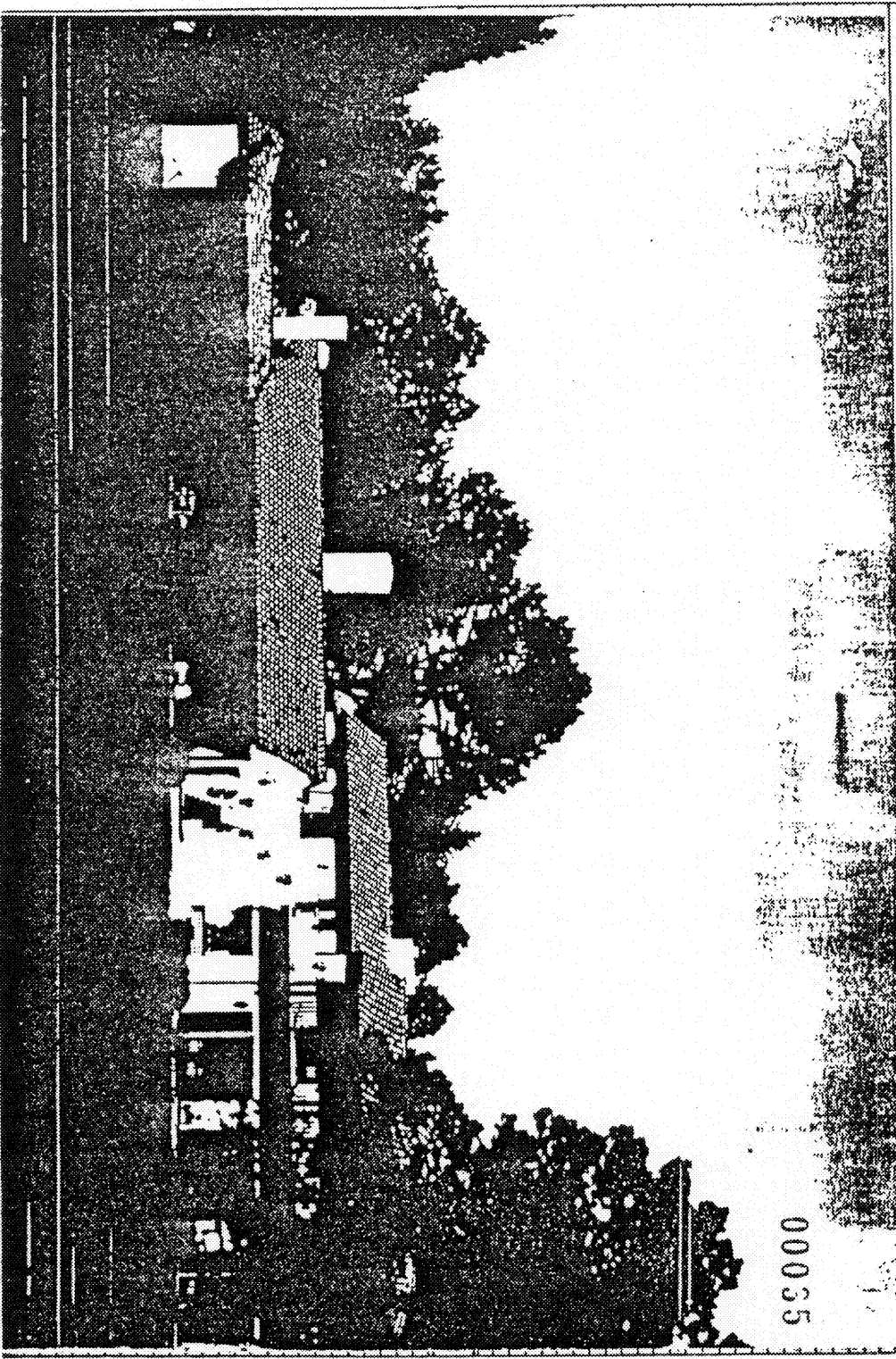
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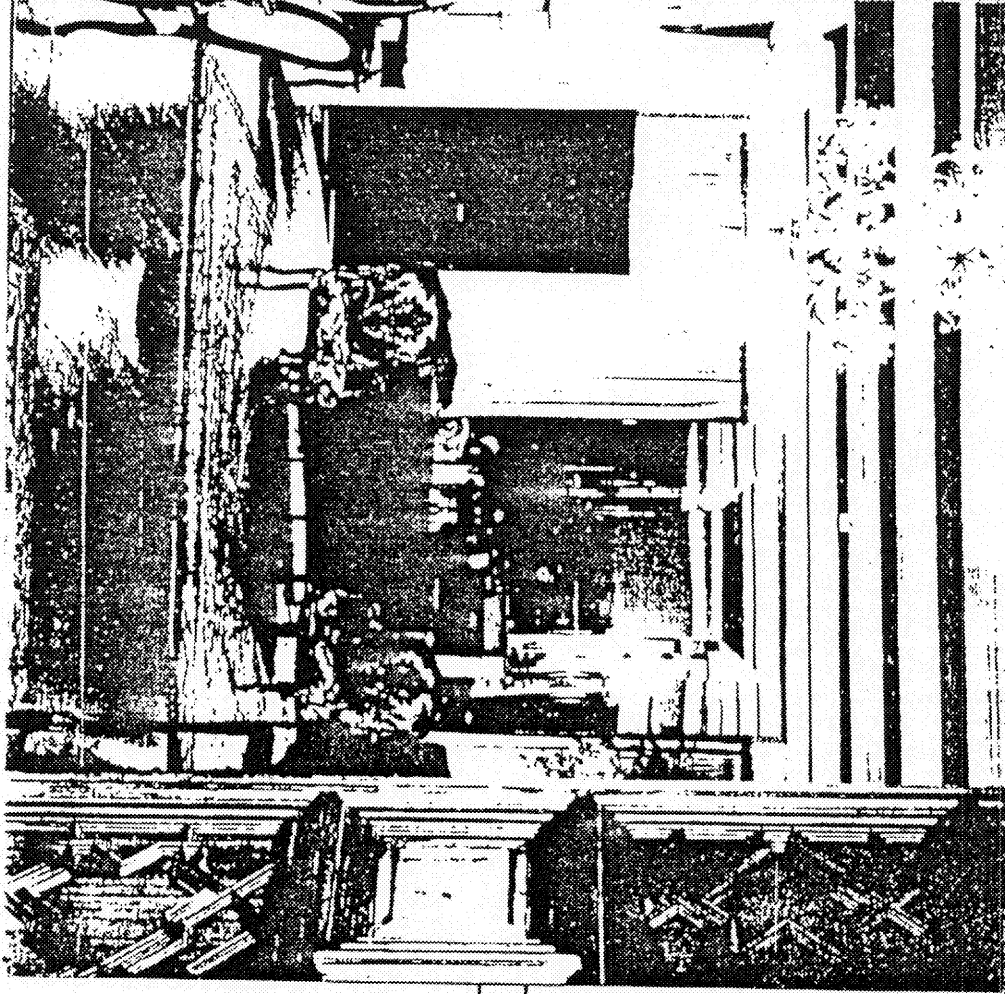
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<p>Prep School and Airman Dormitory Rooms</p>	<p>Dormitory Support Spaces</p>	
<p>Dormitory rooms must be designed with function as the overriding criterion. These rooms, in general, should accommodate the student's and airman's needs for sleep and privacy, yet maintain an austerity compatible with the original philosophy of the Academy.</p>	<p>Dormitory support spaces such as TV rooms, in general are to follow the guidelines that apply to the dormitory rooms. Increased light levels and change in material in an accent wall must be considered to emphasize special functions of these rooms.</p>	<p>express the same level of intrinsic elegance, technical perfection, and appropriateness as the architecture of the Academy. The design concept needs to be well thought out and sensitive to all spatial, programmatic and aesthetic requirements, and it should be approved as a package before funding is initiated or material ordered. This will assure that the design concept is carried out fully in all dimensions and areas of the space.</p>
<p>The flooring in all dormitory rooms is to be carpet or sheet product in a color and texture appropriate to the durability required for heavy use.</p>	<p>Mail slots and storage units are to be plastic laminate to follow millwork guidelines, as listed in the General Areas section.</p>	<p>Millwork and graphics shall be consistent with the standards provided in these guidelines.</p>
<p>All walls are to be a hard surface painted a single color. The base shall be a straight rubber base.</p>	<p>Retail/Theatre/Hospital Lobbies</p>	<p>Entries to these special function areas shall conform to the guidelines listed under Primary/Secondary circulation corridors.</p>
<p>One wall of the dorm room is to be accented with a change in color.</p>	<p>These lobbies in general shall conform to the guidelines of building lobbies listed earlier in this section.</p>	
<p>The ceilings in dorm rooms are to be the painted structure or painted Gypsum board. Ceiling mounted 1x4' fluorescent fixtures with white trim, equally spaced in the ceiling shall provide general illumination.</p>	<p>Retail/Service Functions/Recreational Functions</p>	<p>00034</p>
<p>Perimeter heating is to be painted to match the walls.</p>	<p>These special function areas should strive to relate in design intent to their surroundings, creating diversity while maintaining the integrity of the architecture of the Academy. The Interior Planning Guidelines shall be followed incorporating elements such as spaces enclosed within forms which adhere to the governing grid, colored entry planes, and tile banding in the floor.</p>	
<p>Closet doors shall be treated similarly to single doors and frames.</p>	<p>Any type of wood trim is unacceptable. All trusswork shall be painted a shade darker than the walls of the space. While the finish selections and lighting should directly relate to the atmosphere intended for the function, they should</p>	
<p>Dorm room private bathrooms shall comply with the toilet room guidelines enumerated in the General Areas section.</p>		

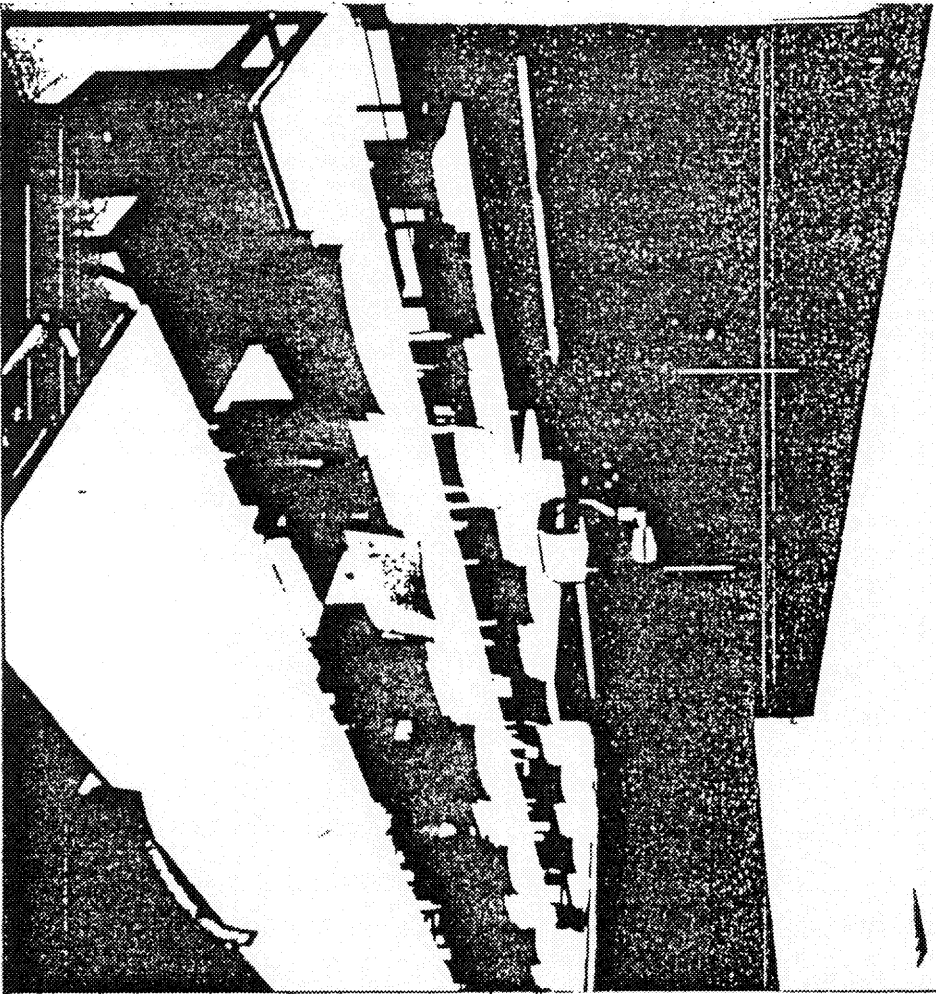




00035


		
<p>The Carlton House</p> <p>Any work done to the Carlton House shall be approved by the civil engineering department and the state preservation office.</p>	<p>Community Center Chapel</p> <p>The chapel shall comply with basic guidelines, but be treated in general as a special function area that is separate from typical functions. While finish selections and lighting should contribute to the uniqueness of the space, the interior must maintain the high level of design intent and quality which is integral to the rest of the Academy. Due to the irregular shape of the space, the chapel should be enclosed within a rectilinear form. The chapel design shall be approved as a package before funding is initiated. This will assure that the design concept is carried out fully in all dimensions of the space.</p> <p>Community Center Chapel</p> <p>The library shall follow the guidelines for Retail/Service Function/Recreational Areas. The administrative spaces of the library shall follow the guidelines for typical administrative functions.</p>	

00036



726 Typical classroom in Fairchild Hall

00037

# GENERAL AREAS

## Instructional Spaces

All instructional spaces shall be utilitarian, with aesthetics derived from function.

### Floors

Flooring in classrooms and labs shall be of a hard material as specified in the Finish Schedule, light in color with no borders. Raised platform areas in lecture halls shall be carpeted. The floors of entries and instructor areas of the lecture halls should be in a hard material, as specified in the Finish Schedule, of a solid color. Large lecture halls or auditoriums shall have carpet along their circulation paths with a solid color hard material for the floor at the seating area. The stage shall be in a material and construction to match the existing.

### Walls

All walls in instructional spaces are to be a painted hard surface. The base shall be a rubber base, covered on a hard surface or straight on carpet.

Black chalkboards with stainless steel or aluminum trim and eraser holders shall entirely line three walls of the classroom. Mounting heights and sizes are to match existing. The fourth wall shall be full height sliding chalkboards with stainless steel or aluminum trim. Behind the sliding chalkboards shall be a continuous storage closet. If, for programmatic reasons, storage closets are not required, the fourth wall can have

a white marker board to match the other three chalkboards in size and mounting location.

Lecture halls shall have the white marker boards extending the entire length of the instructor's wall.

Maps, screens, and other accessories are to be mounted directly onto the top track of the chalkboards. If a larger screen is required, the screen must be mounted from the ceiling. Projection boxes must also be mounted to the ceiling.

A standard 12" diameter clock, white face with black numerals and trim, is to be centered on the elevation directly above the chalkboards. Instructor laboratory consults shall have a metal base and slate work surface detailed similar to the original design.

Projection booths shall have flush metal frames separated from the wall by a reveal. Frames shall be painted to match the wall.

Glass shall be clear.

If acoustic treatment is required, but jointed panels of a durable fabric that will not show wear after heavy use may be installed from the top of the base to the ceiling. The panels should extend the entire length of the wall and align with the ceiling grid. The color of the fabric panels shall be one that does not distract from instruction.

### Ceilings

The ceilings in all instructional spaces except lecture halls are to be a suspended 2' x 2' grid

system as specified in the Finish Schedule. The suspended system shall float 6" away from all wall surfaces, creating a cove. A continuous warm fluorescent light strip shall be located in the cove. 2'x2' parabolic warm fluorescent light fixtures are to be located within the suspended ceiling in a uniform pattern.

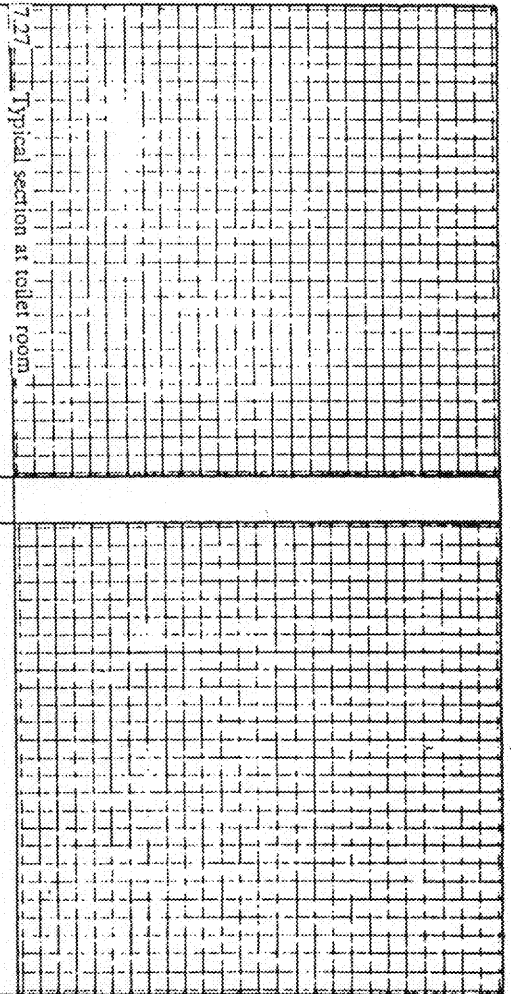
Ceilings in lecture halls shall be acoustic fabric panels in a dark color when possible, or a material and finish suitable for the acoustics of the room. A drywall ceiling in a light finish shall occur over the major circulation along all four sides of the room. Lighting is to be incandescent fixtures that can be dimmed, located in a uniform and functional pattern relating to the governing grid.

### Support Spaces

All service and support areas such as coffee, copy, and file rooms are to be designed with ultimate function and flexibility in mind. All finishes shall be a material appropriate to the level of support.

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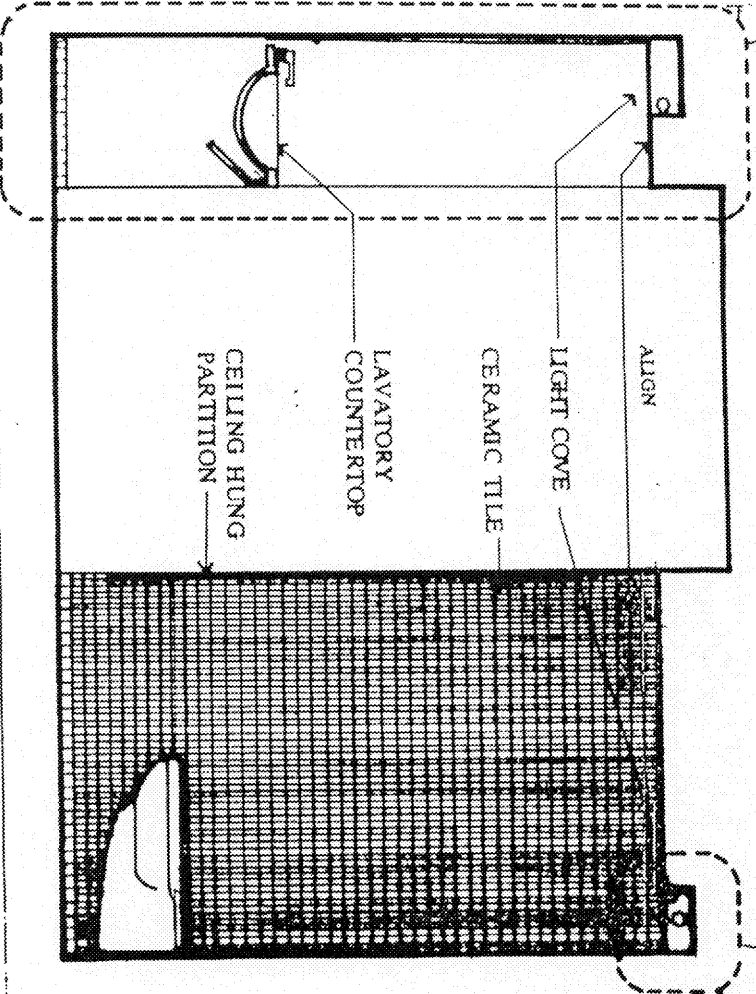




7.8

7.8

7.8 Typical section at toilet room



ALIGN

LIGHT COVE

CERAMIC TILE

LAVATORY  
COUNTERTOP

CEILING HUNG  
PARTITION

# Toilet Rooms

## Floors and Walls

Toilet, locker and shower rooms must have a floor and base of a hard material. Wet areas shall have a nonpenetrable surface extending full height with typical walls being gypsum wallboard with either a solid color, stipple vinyl wall covering, vinyl tone on tone texture, or painted. All floors and walls shall be of a solid color with no borders or accent strips.

## Ceilings

The ceilings are to be painted gypsum wall board. A drywall soffit shall occur at and align with the toilet partitions and lavatory top. Recessed downlights are to be used for general illumination with an architectural fluorescent cove over the toilets and vanities at the wall plane.

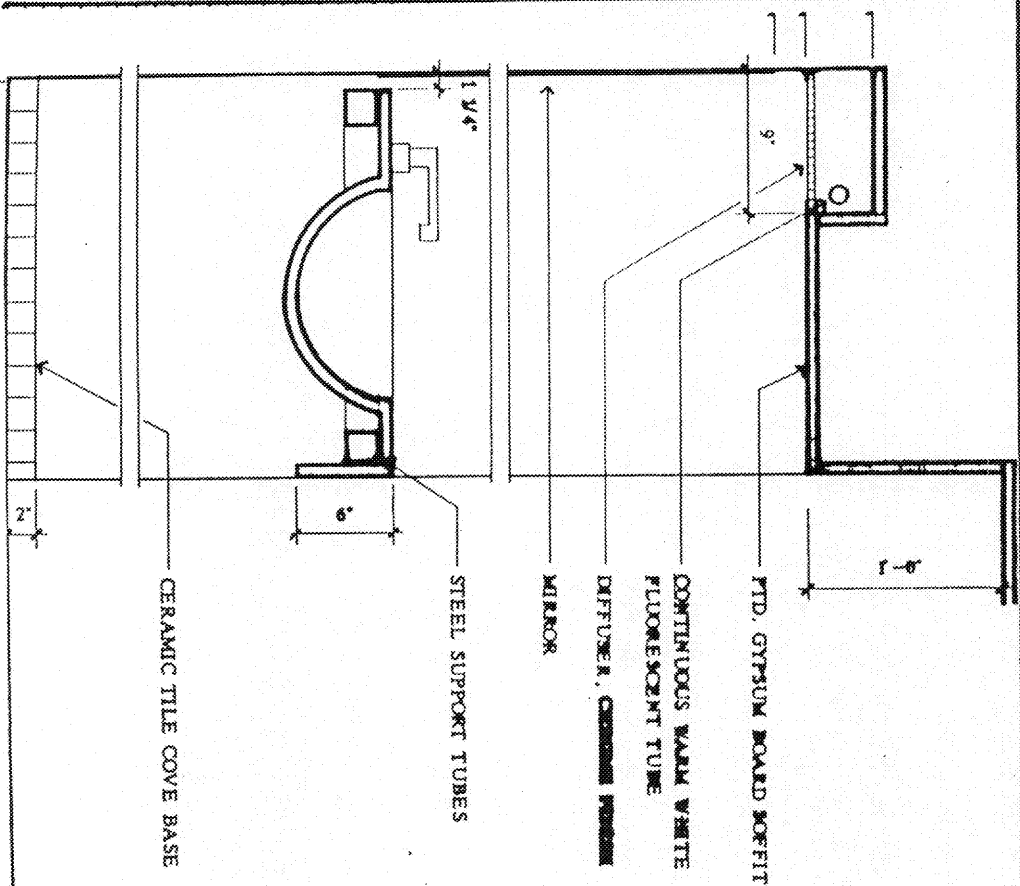
## Accessories, Partitions, Fixtures

00039

A continuous mirror shall occur along the entire length of the vanity and extend from the counter to the soffit. The toilet partitions are to be ceiling hung, except in areas with high Cadet usage which will be floor mounted with a baked enamel finish. The lavatory top is to be continuous counter, white stone or corian with an apron, covering the sink plumbing. All fixtures are to be white porcelain or cast integrally with the countertop; toilets are to be wall-mounted, except in areas with high Cadet usage, where

[illegible]

7.28 Typical section at toilet room vanity and light cove



technical perfection and appropriateness to the original Cadet Area architecture. The design concept needs to be well thought out and sensitive to all spatial, programmatic and aesthetic requirements, and it shall be approved as a package before funding is initiated. This will assure that the design concept is carried out fully in all dimensions and areas of the space.

#### Acoustics

Acoustical criteria for the Cadet Area interiors can be expressed in both a sound transmission classification (STC) and a noise criteria level (NC). The parameters for noise control applicable to the different functions in the Academy are as follows:

#### Sound Transmission Classification

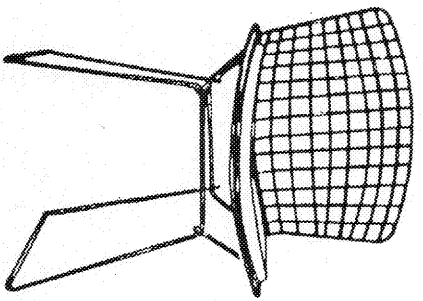
- Classroom to classroom - STC 47
- Office to office - STC 47
- Dorm room to dorm room - STC 47
- Private room to circulation corridor - STC 47
- Toilet rooms to occupied space - STC 45
- Occupied space to equipment rooms - STC 55

Noise Criteria Level **00041**

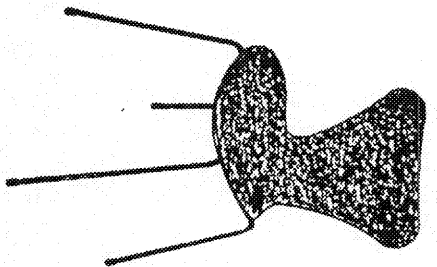
- Occupied spaces - NC 35
- Toilets, lobbies, circulation paths - NC 40
- Kitchen - NC 50

Acoustical requirements for special spaces within the Cadet Area include both STC and NC criteria as well as specific sound reverberation consideration. These areas and criteria are as follows:

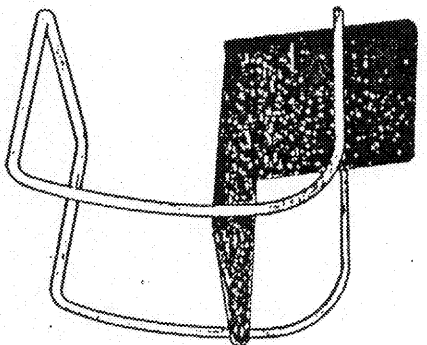
	<p><b>Auditorium</b></p> <ul style="list-style-type: none"> <li>Background Noise Criteria. Wall, floor, and ceiling constructions and the impact of the mechanical systems shall be at the ambient sound level in the NC 25-30 range.</li> <li>Sound Isolation Requirements. Moderate to high sound isolation is a requirement. Entry vestibules are recommended to separate the auditorium from any adjacent display area. Floor, ceiling, and stud walls with multiple layers of gypsum board and glass fiber batt insulation with a STC 50-55 and gasketed acoustically rated doors must be used for proper sound insulation.</li> <li>Room Finish Materials. The acoustical environment is based on a reverberation time of 0.5 to 1.0 second. Surface finishes should include suspended sound-absorbing elements at the ceiling, and acoustically absorptive panels (NRC 7 or greater) on approximately 50% of the side wall area, and 100% of the rear wall area.</li> </ul>	<ul style="list-style-type: none"> <li>Room Finish Materials. The acoustical environment is based on controlling unwanted reverberation and sound reflections. Surface finishes, where practical, should include carpeting.</li> </ul> <p><b>Carpeting</b></p> <p>All carpet work, except as modified by covering codes, must comply with the carpet and rug institute "The Carpet Specifier's Handbook".</p> <p>Carpet in general purpose area shall be loop or combination loop and cut pile for maintenance and durability considerations. Either roll goods or carpet tile may be used, however, cost, maintenance, longevity, and flexibility must be considered for each installation. Upgraded areas can be a cut pile roll good.</p> <p>The carpet shall appear textural in appearance. Obvious patterns, linear runs and large prints are not acceptable. Either multiple colors or a single color may be used, but a single monolithic effect must be maintained.</p> <p>The carpet selected must be in a quality level appropriate for the level of foot traffic anticipated.</p> <p><b>Ceiling Systems</b></p> <p>00042</p> <p>2'x2' ceilings shall be a product equal in composition and finish to Armstrong Cirrus Tegular One Step ceiling panels with 9/16" white grid. All 12"x12" ceilings must be glue-in applications. The finish of all ceiling tile is to be white.</p>
	<p><b>Divisional Conference Room</b></p> <ul style="list-style-type: none"> <li>Background Noise Criteria. Wall, floor, and ceiling constructions and the impact of the mechanical systems shall be at the ambient sound level in the NC 30-35 range.</li> <li>Sound Isolation Requirements. High sound isolation is a requirement. Floor, ceiling, and stud walls with multiple layers of gypsum board and glass fiber batt insulation with a STC 50-55 and acoustically rated doors must be used for proper sound insulation.</li> </ul>	



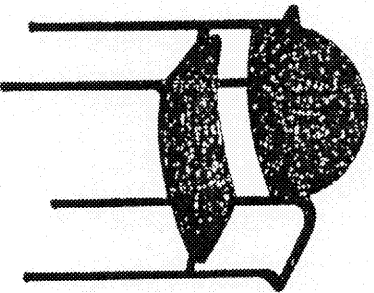
Knoll Benoyia Chair



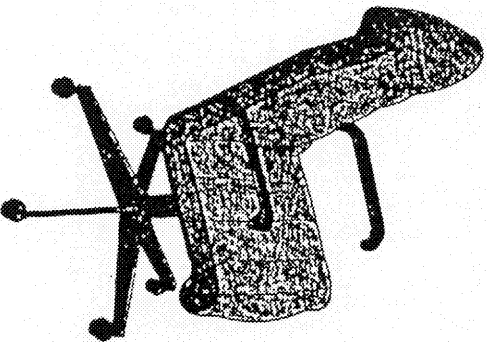
ICF Jacobsen Chair



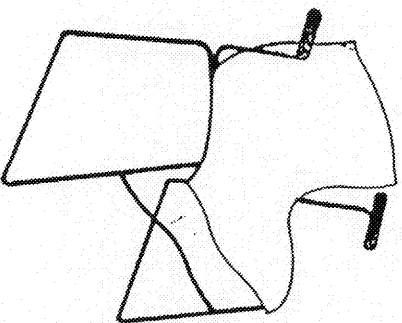
Knoll Bruno Chair



Krueger International  
Versa Armchair



Knoll Sapper chair



Knoll Handkerchief Chair



and lines, to complement the original design intent of the Academy.

### Color

The characteristics of color can be generally defined using its three attributes of hue (red, yellow, blue), value (light, dark), and chroma (bright, neutral). The overriding color principles throughout the interiors are chromatic control and value contrast.

The majority of finish materials within the Academy are of various values ranging from white to black, but are generally chromatically neutral. This neutral palette is to be shades of black, gray or white to be compatible with the existing architecture in the Cadet Area and throughout the Support Areas. The predominant wall color throughout is to be PPG #2541 "Abbey". Metal door frames in offices are to be painted PPG "Pussy Willow Grey". Floor fields, ceilings, and most wall surfaces are to be white or light in value. Fabric panels and wood veneers shall be medium in value. Floor borders, base, and handrails are medium or dark in value. Cove base in offices shall match the paint color PPG "Pussy Willow Grey" on door frames. Variety and visual interest are achieved through this value contrast, but it is the overall chromatic control which creates a unifying harmony of materials.

Areas that are defined as a point of entry shall be of a hue and chroma which sharply contrast with the generally neutral palette. Blue, red, and yellow venetian glass tiles cover the Cadet Area building entry walls. Similarly, colored walls should be introduced at all support and building entries. Brightly colored doors distinguish themselves from wall planes, and corridors or circulation paths terminate themselves into either

furniture system. Special functions or spaces may also be enclosed by a contrasting hue. All building shall have one color designated for the points of entry on each floor. The Academy's class colors, primary red, primary blue, primary yellow, and silver shall be used for the colored planes. Air Force Academy blue shall consistently be PPG #

### Furniture

Furniture throughout the Academy, should be timeless, classic pieces composed of simple forms and lines to complement the original architectural intent. All furniture must relate to the governing grid in both plan and elevation and coordinate with the building systems including mechanical, electrical, computer and telephone when necessary. The finishes of the furniture shall relate to the architecture of the surrounding space, utilizing materials such as glass, light and dark metals. In general, wood frames and trim are not consistent with the original architectural intent of the Academy and therefore are not acceptable. Wood veneer pieces shall be used only in upgraded areas and dorm rooms with the form of these pieces having clean, very simple lines. The quality levels of all furniture must be representative of the high quality and integrity of the Academy architecture. Selections must be based on visual design conformity, economics, durability and longevity. All furniture purchases must be fully coordinated with Civil Engineering prior to purchase.

Waiting/Lounge Furniture

material and scale to the surrounding space. All furniture should be placed logically and so as not to impede circulation, particularly in public areas. Sofa and lounge chairs should be fully upholstered, recliner in form appearing solid in color. Textured upholstery may be used to provide interest. The color of upholstery in lobbies is to relate to the neutral background palette of the space or complementary to the primary color used in the entry wall plane of the lobby. Occasional/end tables are to have metal frames, either stainless steel, aluminum or painted, with glass tops. The dimensions of occasional/end tables shall correspond proportionally in plan and elevation to the furniture grouping.

Benches in lobbies shall have a marble top in upgraded lobbies and an upholstered top in typical lobbies.

### Office Furniture

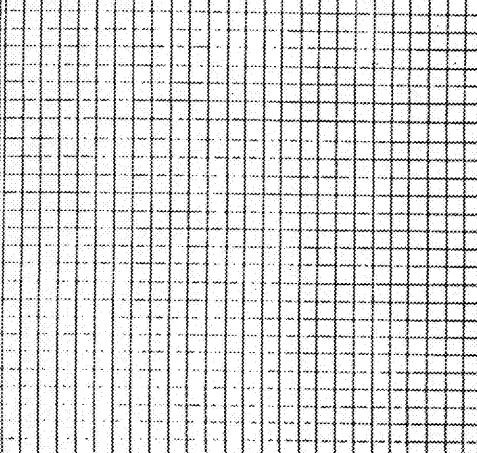
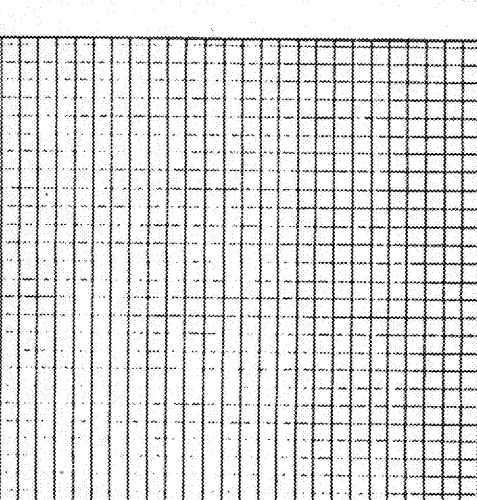
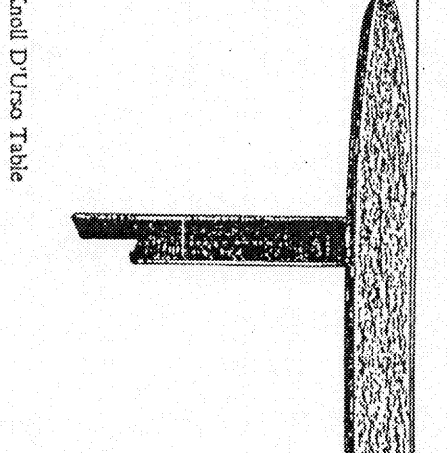
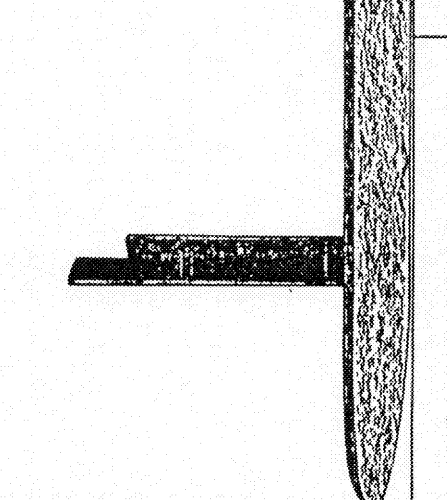
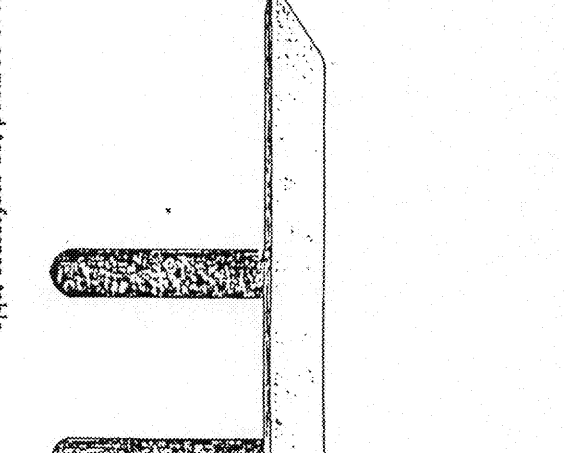
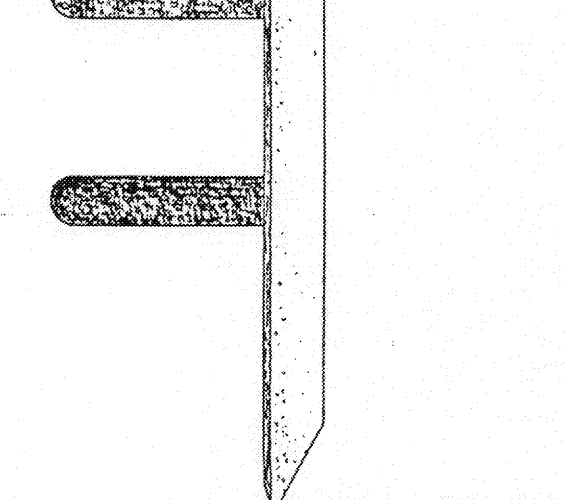
00044

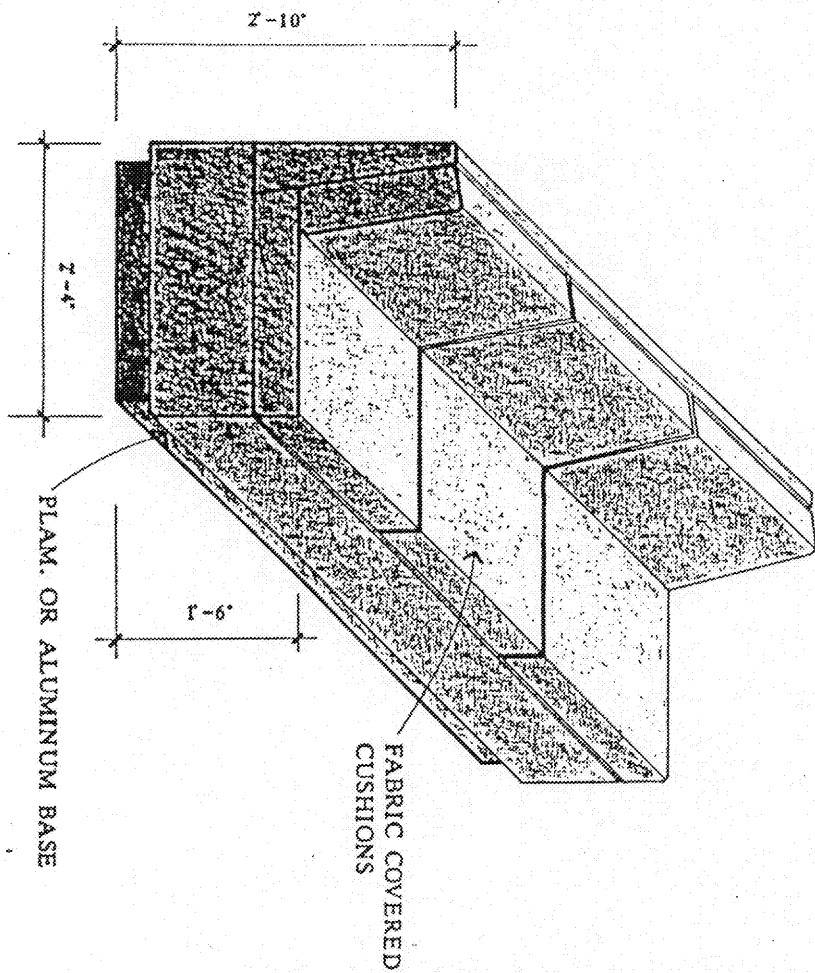
Office chairs, desks, and miscellaneous furniture should be of a material appropriate to the administrative hierarchy. General office task chairs with casters shall have black frames and seat backs. Upholstery should be a solid neutral color in a medium to dark value. The scale of all furniture should relate to its function and the surrounding space. Care should be taken that arm heights correspond to table heights and chair widths and heights are appropriate to table widths and heights, such as conference tables and occasional tables. All wood veneer in desks and conference tables shall be compatible in color and finish to the existing veneer in the Cadet Area.



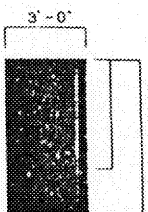
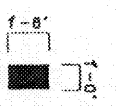
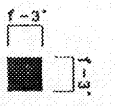



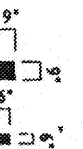
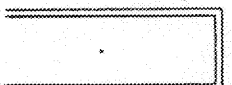
<p>Furnishings systems are key as an extension of the design as well as the flexibility and function of the Academy. They must correspond in dimension, both in plan and height, to the planning grid. Functional requirements within a workstation that may require a special shape or configuration must be enclosed within a rectilinear form. No curved panels are acceptable. The systems shall have exterior wood veneers panels in a species and color compatible with the existing veneer, and acoustical fabric on the panels in the office interior. The finish of the workstation components are to be either wood veneer or solid color plastic laminate. Figured recomposed veneers may be used in lieu of natural wood veneer, however, wood grain plastic laminate is not acceptable on either the interior or the exterior of the modular furniture. The following criteria must be met for all modular furniture:</p> <ul style="list-style-type: none"> <li>• Flexibility</li> <li>• Adjustable work surfaces</li> <li>• Integrated components</li> <li>• Wire management</li> <li>• Storage options</li> <li>• Integrated file units</li> <li>• Flexible combination of panels</li> <li>• Interchangeable components</li> <li>• Range of components and finishes to span different hierarchy levels</li> <li>• Power supply at base and/or work surface</li> <li>• Acoustical panels</li> <li>• Ample raceway to incorporate electrical and communications cabling, demountable and movable with minimum disruption to the work process.</li> </ul>		
<p><b>Modular Furniture</b></p>	<p><b>Instructional Furniture</b></p> <p>All loose or built in furniture used in instructional spaces shall continue the original concept which is based on satisfying functional needs. The forms of the furniture must be simple and geometric in plan and elevation and be compatible with the original furniture designs. The color of desks and work surfaces is to be neutral in shades of light tone whites to medium tone greys to match the original furniture and architecture. All trim and metal shall be in a neutral palette to match. To enhance the utilitarian nature of the instructional furniture, all seats are to be clean, simple forms in primary colors. Podiums in auditoriums shall have an aluminum pedestal base with 3 legs.</p>	
	<p><b>Dorms</b></p> <p>Metal desk frames originally used in dorms shall be reused. New tops shall be plastic laminate in a solid neutral color. New utility table and desk purchases should be of similar materials, construction, and scale to the originals. Dorm room furniture shall be simple, regular, and rectangular in response to the overall governing grid. This rectilinear enclosure shall be accommodated in both plan and section. All furniture frames should be metal with horizontal and vertical panels of solid plastic laminate with aluminum edge trim. Desk chairs are to be ergonomic. Side chairs shall have metal frames to match original brushed aluminum chairs with upholstered seats.</p>	<p>00046</p>



		<p>Special Areas</p> <p>00047</p>
<p>Knoll D'Urso Table</p> 		<p>The finishes and upholstery for special area furniture should relate to the level of finish intended for the area and possess the same high level of quality intrinsic to the Academy.</p> <p>Dining area seats must be appropriate to the design intent, simple in form and line, and constructed of a durable and high quality material. Original aluminum pedestal table bases should continue to be reused with solid color plastic laminate tops. Booths in the dining areas shall have 1'-6" seat height, 2'-10" overall height, with plastic laminate or aluminum finish trim.</p> <p>Waiting area seats should in general follow the guidelines for lounge furniture. The seating should be placed in logical, thoughtful groupings and conform to the governing grid when occurring within a function such as a circulation path.</p> <p>The seats in the Fairchild Hall lecture hall should be reupholstered in primary red.</p>
<p>Stone or wood top conference table</p> 		<p>7.31 Conference Room Tables</p>



00043

<p>Information Sign Types AA1, AA2</p> 		
<p>Identification Sign Types BB1, BB2, BB3</p> 		
<p>Direction Sign Types CC1</p> 		
<p>Regulation Sign Types DD1, DD2</p> 		<p>7.33 Interior sign types</p>

00043

	<p>PPG Corundum 4750 Chromium Gray 2751</p>	
<p>Graphics</p> <p>All graphics and signs shall meet all applicable codes and safety requirements and conform to the Department of the Air Force Sign Standard AF88-40, see appendix A, as modified by the United States Air Force Academy to meet Academy needs dark grey with light grey letters, light grey with dark letters. Visual clutter is to be reduced by minimizing the number of signs, their type, and use. All information on signs shall be concise and direct.</p>	<p>Interior signs must follow these standards in terms of system organization, sign types and sizes. Variations in the types of hardware are permitted but all corners must be square.</p> <p>The standards are arranged to guide visitors through a building, from the entrance point to the correct floor, the correct area of a floor, the correct office, and (if appropriate) the correct desk. The design of these interior signs is compatible with the signs shown in the GSA Manual of the Design of Sign/Symbol Systems for Federal Facilities.</p>	<p>separately at the end of this section. The size, recommended design and grid specifications for each type of sign are provided on the following pages.</p> <p>Information Signs</p> <p>The type AA1 building directory is used for all buildings. Located in the main entrance lobby, it should be clearly visible to visitors as they enter the building. The building directory consists of a permanent header panel with the name of the building or the major organization in the building, plus a directory section that lists each tenant. A diagrammatic floor plan can be added in the expanded version of the type AA1. The directory section is a changeable board with slots and slide-in plastic inserts for text. Refer to the diagram of type AA1 for the sign grid and specifications.</p>
<p>Interior Signs</p> <p>Interior signs should relate to interior architecture and color schemes if possible. Since buildings vary a great deal, interior signs will also vary. The standards discussed here are intended to apply to buildings that do not have interior signs designed specifically for them and to serve as general approach to the design of all interior signing. All interior signs should be designed so they are as low maintenance as possible. Personnel changes are frequent and offices are often moved. Consequently, these designs must be flexible enough to adapt to such changes. The systems described here meet this criteria. All</p>	<p>As with the exterior signs, interior signs are standardized by function. They are discussed in the order that a visitor entering a building would use them to find a given destination. The four sign categories are:</p> <p>Information Identification Direction Regulation</p> <p>Bulletin boards show materials that relate to several functions - information and regulation as well as motivation - and thus, are shown</p>	<p>Colors: White letters on black background, emblem in full color</p> <p>00050</p> <p>Dimensions: 3'-0" x 6'-0"</p>

4'-0"		7'-3 1/4"	
2'-0"		Building directory type AAI	

3/4"	1"	3'-8 1/2"	1"	3/4"
CAP	T			
CAP	T			
CAP	T			
3"				
3/4"				

# Harmon Hall Accounting and Finance

Medium Tile Count 30

7'-8" (Revised)

Accounting and Finance Officer	116	Command	137
Military Pay	246	Support Assistant	311
Civilian Pay	237	Chief of Staff	216
Travel Pay	305	Executive Officer	237
Commercial Services	129	Senior Personnel Advisor	241
Classification Section	311	Administration	128
Labor Relations Section	242	Registrar	304
Data Management Support	300		
Judge Advocate	216		
Plans and Programs Registrar	233		

2'-2 1/2"

3'-0"

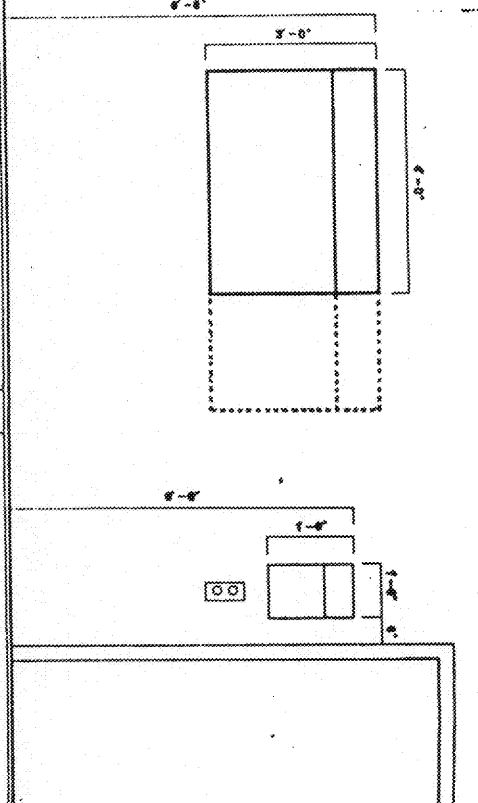
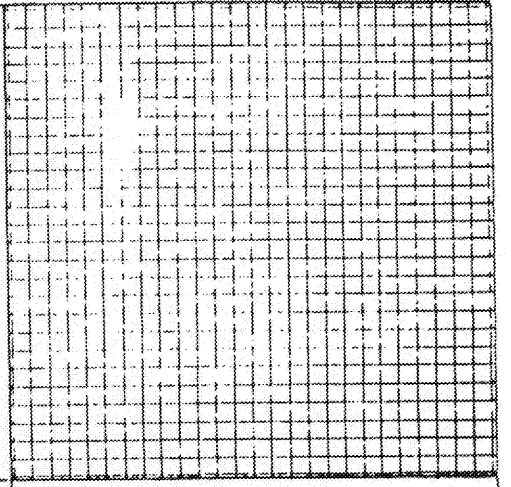
00051

Medium Tile Count 45

Medium Tile Count 45

DIRECTORY ENLARGED WHEN  
PLAN OF BUILDING IS REQUIRED





Frame: Brushed aluminum.

Message: Heading - upper and lower case helvetica medium, 2" capital letter height, flush left. Secondary Heading - upper and lower case helvetica regular, 2" capital letter height, flush left. The heading area will accommodate two lines with a maximum line length of 30 titles or characters per line. Text - upper and lower case helvetica medium, 1/2" capital letter height, flush left. The text area will accommodate three columns of 19 lines each, with a maximum line length of 45 titles or characters per line. The third column should include a plan of the building in the lower portion.

lower case helvetica medium, 3/8" capital letter height, flush left. Insert, text - upper and lower case helvetica regular, 3/8" capital letter height, flush left. The insert message area will accommodate 15 lines with a maximum length of 35 titles or characters per line.

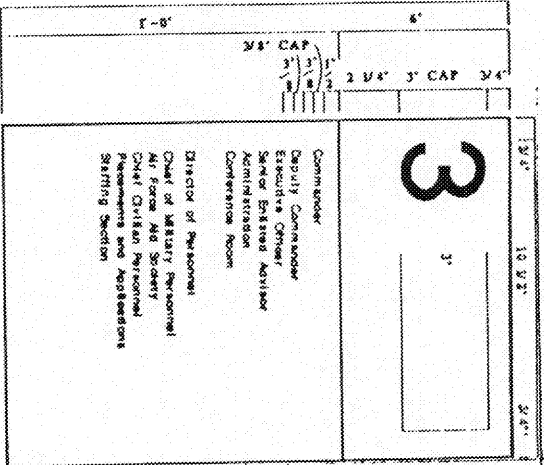
#### Identification Signs

There are three types of office identification signs. The type BB1 sign is used to identify a major office or area in a building (such as a wing or annex). The Type BB2 and Type BB3 sign is used for all other designated offices. However, both sign types may be used. Each sign consists of a permanent header panel with the room number, wing or annex designation plus an insert panel which identifies the tenant. The insert panel is a clear sleeve which will accept a paper or plastic insert with the name of the tenant. The room number sign, Type BB3, is used to identify a secondary office entrance or a room with no designated function. This sign consists of a header panel only, without the insert panel. It should be positioned at the same height from the floor as the Type BB2 sign. Refer to the diagram of BB1, BB2 and BB3 for the sign grids and specifications.

The Type AA2 floor directory should be located in the elevator lobbies of each floor, clearly visible to traffic entering into the lobby from elevators or corridors. If the floor is not serviced by elevators, the floor directory should be located in the major stairway landings. Refer to the diagram of AA2 for the sign grids and specifications. The type AA2 floor directory consists of a permanent header panel with the floor number, plus an insert panel that lists each tenant on the floor. The insert panel is a clear sleeve which will accept a paper or plastic insert listing the names of tenants. A simple typewritten sheet may be used as an insert, as shown.

Colors: Header panel - light grey letters on dark grey background; insert panel - dark grey letters on light grey background. Dimensions: 1'-6" x 1'-0".

Message: Floor number - helvetica medium, 3" number, flush left. Insert headings - upper and

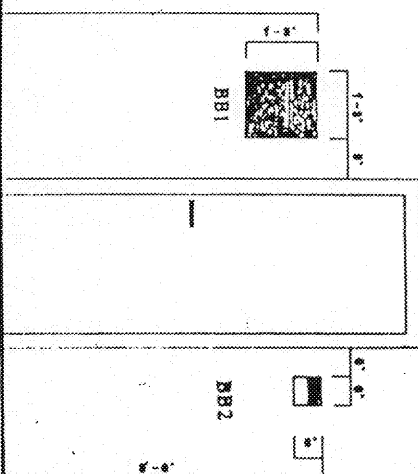


Maximum Title Count: 35  
1'-0"

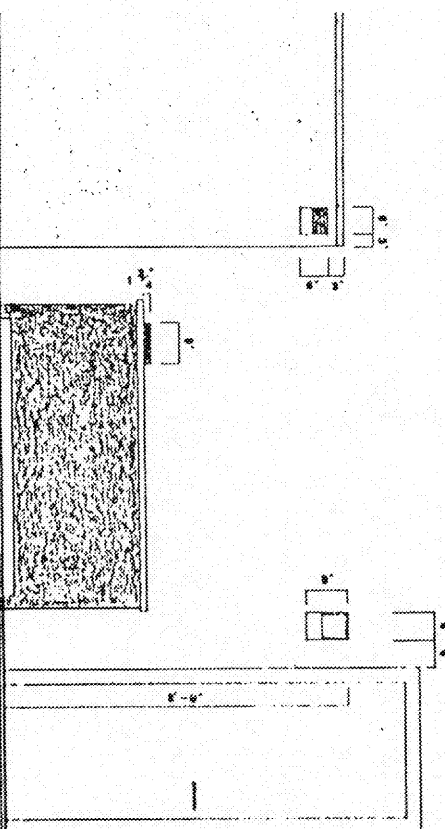
735	Building directory type AA1 and floor directory type AA2
736	Floor directory type AA2

7.37 Office identification types

7.38 Partitioned office identification type  
BB4, desk plaque type BB5, and  
service identification type BB6



7.37



7.38

00053

Message: Heading - upper and lower case helvetica medium 1-1/2" capital letter height, flush left. The heading area will accommodate two lines with a maximum of 12 tiles or characters per line. Tenant name - upper and lower case helvetica medium, 3/4" capital letter height, flush left. Secondary information - upper and lower case helvetica regular, 3/4" capital letter height, flush left. The insert area will accommodate four lines with a maximum of 24 tiles or characters per line.

Sign Type BB2 and BB3 Colors: Header panel - light grey numbers on dark grey background; insert panel - dark grey letters on light grey background. Option: Header panel - dark grey numbers on light grey background; insert panel - light grey letters on dark grey background.

Dimensions: 6'x9", 3'x9", 1'x9"

Tenant Name: Upper and lower case helvetica medium, 3/4" capital letter height, flush left. Secondary information - upper and lower case helvetica regular, 3/4" capital letter height, flush left. The insert area will accommodate four lines with a maximum of 24 tiles or characters per line.

Message: Room number - helvetica medium, 1-1/2" numbers, flush left. Tenant name - upper and lower case helvetica medium, 1/2" capital letter height, flush left. Secondary information - upper and lower case helvetica regular, 1/2" capital letter height, flush left. The insert area for the type BB2 sign will accommodate four lines with a maximum of 21 tiles or characters per line.

7.39	Partitioned office identification type BB4, desk plaque type BB5, and service identification type BB6		
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The desk plaque, Type BB5, is used for individual identification. The plaque, without its base, may also be mounted on the office partition in place of the Type BB4 sign.

The service identification sign, Type BB6, is used to identify restrooms, telephones, and other services. Refer to the diagrams Type BB4, BB5 and BB6 for the sign grids and specifications.

Sign Type BB4 Colors: Header panel - light grey letters on dark grey background; insert panel - dark grey letters on light grey background. Option: Header panel - dark grey letters on light grey background; insert panel - light grey letters on dark grey background.

Message: Office name - upper case helvetica medium letters and numbers, 1" high, flush left. The tenant name should be typewritten on a 3"x6" card, flush left, as shown below.

00054



<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>231</b> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;">             Civilian Personnel Classification Section           </div>		<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>232</b> </div>	
<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>Bldg. 8134</b> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;">             Civilian Personnel Classification Section Safety MWR DCS/Logistics           </div>			

background.

Message: Name - upper and lower case helvetica medium 1/2" capital letter height flush left. The name line will accommodate a maximum of 21 tiles or characters. Title - upper and lower case helvetica medium, 3/8" capital letter height, flush left. The title line will accommodate a maximum of 30 tiles or characters.

Sign Type BB6 Color: Symbols - black symbol or red symbol (where appropriate) on white background.

Dimensions: 9'x6'.

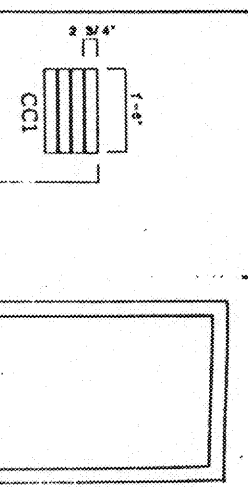
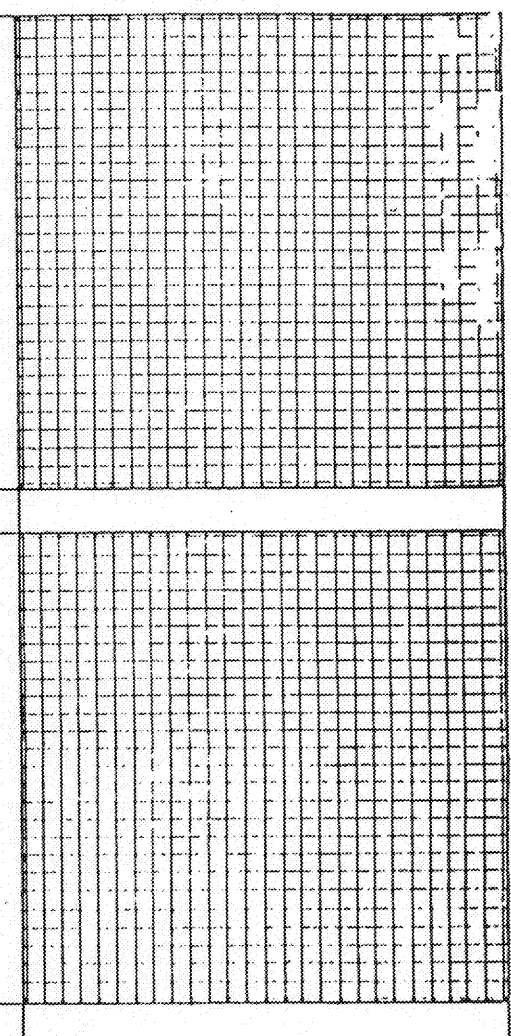
Message: Service name - helvetica medium upper and lower case, 1" capital letter height, centered. The message line will accommodate a maximum of 7 tiles. Service name - helvetica upper and lower, 3/4" capital letter height centered.

The message line will accommodate a maximum of 9 tiles.

Directional Signs

00055

The wall mounted Type CC1 directional sign should be located at each decision point - opposite the elevators, opposite the stairways, at each corridor intersection. The directional sign should point to room numbers. Only high priority destinations - those most often sought by people entering the building for the first time (such as Finance, Pass and ID, or Vehicle Registration) - should be listed by name. This greatly simplifies maintenance as well as initial fabrication. Every building should have a directory at each entrance.



7.41

1'-0" 1'-4 1/2" 2 3/4"

1 1/2" CAP 1 1/2"

← 130-140, 145 →

100-129 →

Maximum Tile Count 14

← Base Finances →

← Pass and ID →

Maximum Tile Count 14

← 236-240, 232 →

TYPE CCI

1'-0" 1'-7" 2 1/2"

3/4" CAP 1 1/2"

← 130-140, 145 →

100-129 →

Maximum Tile Count 17

1'-0" 1'-7" 2 1/2"

← Base Finances →

← Pass and ID →

Maximum Tile Count 17

2 3/4" 1'-0" 1'-7" 2 1/2"

← 130-140 100-129 →

TYPE CC2

00056

7.42

and a floor directory at each elevator or stairway landing. These directories should have room numbers to give a continuity of directional information from initial entrance, through arrival on the floor, and then to the room. Room numbers placed on or beside doors complete the system. Messages are placed flush left or flush right to the arrow. Arrows pointing left, up, or down, will have flush left messages, and arrows pointing to the right will have flush right messages. The arrow is centered in the space between the message and the edge of the sign. Refer to the diagram of Type CCI for the sign grids and specifications.

Directional Sign, Type CCI Colors: White letters, numbers or arrows on black background.

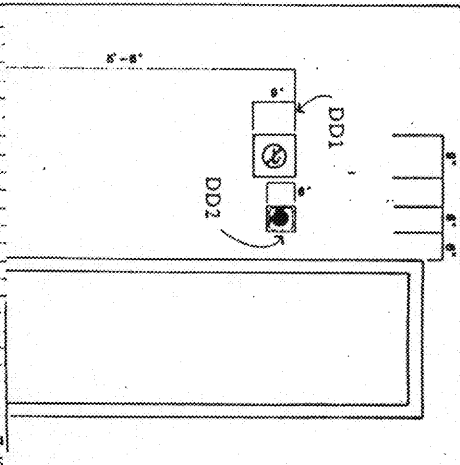
Dimensions: Slats - 4" x 2'-0".

Message: Upper and lower case helvetica medium, 1-1/2" capital letter height, flush left or right (to arrow). The message area of each slat will accommodate a maximum of 14 tiles or characters.

Arrow: Standard tile, 1-1/2" high, placed left or right as appropriate.

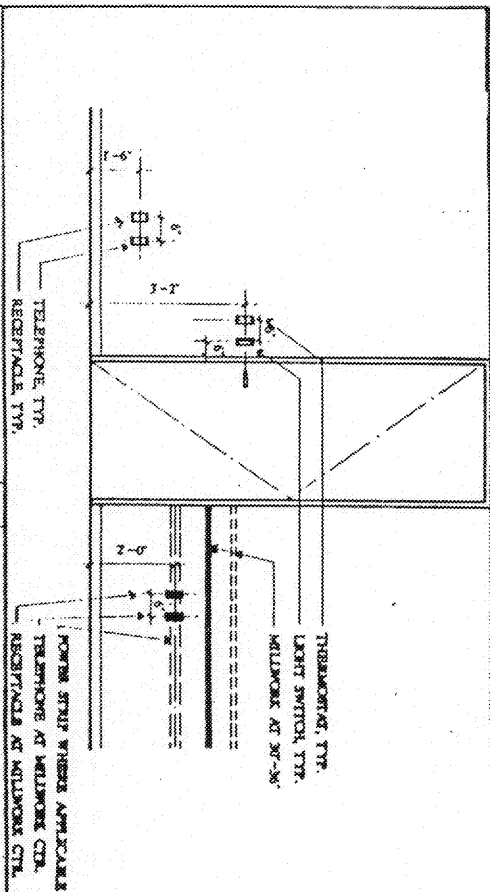
7.41 Direction sign type CCI

7.42 Directional sign types

<p>7.43 Regulation sign types</p> <p>7.44 Regulation sign type DD1</p> <p>7.45 Regulation sign type DD2</p>		
<p>7.44 Regulation sign type DD1</p> <p>7.45 Regulation sign type DD2</p>	<p>Regulation Signs</p> <p>There are many regulation signs required for use in Air Force buildings as specified in AFOSH 127-45, Hazard Signs and Tags, and by OSHA Regulation 1910. These signs should be located at key points in a building where specific warning or prohibitory information is required.</p> <p>The Type DD1 sign should be located in open areas (such as hangars or workshops).</p> <p>The Type DD2 sign should be located in offices, labs, and corridors.</p> <p>OSHA regulations are currently being revised; when the revisions are completed, the Air Force standards for safety signs will be updated by AFISC/SEG.</p>	<p>Bulletin boards, Type EE1, are used for several purposes. Some contain notices, regulations and memoranda. Others contain posters and announcements used to promote worthwhile causes and to advertise community oriented events. The appearance of the bulletin board depends on the visual quality of the materials mounted on it. The unit commander or the person who maintains the bulletin board must insist on keeping the bulletin board materials neatly arranged and current. The bulletin board consists of a permanent header panel with a general title, such as "Notices" or "Information," and a cork panel for bulletins and announcements.</p> <p>Colors: Header panel - white letters on black background; cork panel - medium grey.</p> <p>Dimensions: 3'-0" x 6'-0".</p> <p>Message: Heading - upper and lower case helvetica medium, 2" capital letter height, flush left.</p> <p>Refer to the diagram of Type EE1 for the sign grid.</p> <p>Elevator Graphics</p> <p>00057</p> <p>All elevator graphics shall relate in size and location to the panels of the elevator cab. The graphics are to be proportioned appropriately with the rest of the elevator accessories and installed flush to the wall in vertical alignment with the accessories. The colors of the elevator graphics are to be dark grey letters on a light grey background.</p>
<p>7.45 Regulation sign type DD2</p>	<p>Regulation Signs</p> <p>There are many regulation signs required for use in Air Force buildings as specified in AFOSH 127-45, Hazard Signs and Tags, and by OSHA Regulation 1910. These signs should be located at key points in a building where specific warning or prohibitory information is required.</p> <p>The Type DD1 sign should be located in open areas (such as hangars or workshops).</p> <p>The Type DD2 sign should be located in offices, labs, and corridors.</p> <p>OSHA regulations are currently being revised; when the revisions are completed, the Air Force standards for safety signs will be updated by AFISC/SEG.</p> <p>If the symbol on the Type DD2 sign must be reinforced by a word message for clarity, use the sign grids for the Type BB6 sign. Refer to the diagram of Type DD1 and DD2 for the sign grids and specifications.</p> <p>Colors: Symbols - black symbol and standard red circle with bar on which background.</p> <p>Type DD1 Sign Dimensions: 9"x9".</p> <p>Symbol: 7-1/2" x 7-1/2" square.</p> <p>Type DD2 Sign Dimensions: 6"x6".</p> <p>Symbol: 5"x5" square.</p>	<p>Bulletin boards, Type EE1, are used for several purposes. Some contain notices, regulations and memoranda. Others contain posters and announcements used to promote worthwhile causes and to advertise community oriented events. The appearance of the bulletin board depends on the visual quality of the materials mounted on it. The unit commander or the person who maintains the bulletin board must insist on keeping the bulletin board materials neatly arranged and current. The bulletin board consists of a permanent header panel with a general title, such as "Notices" or "Information," and a cork panel for bulletins and announcements.</p> <p>Colors: Header panel - white letters on black background; cork panel - medium grey.</p> <p>Dimensions: 3'-0" x 6'-0".</p> <p>Message: Heading - upper and lower case helvetica medium, 2" capital letter height, flush left.</p> <p>Refer to the diagram of Type EE1 for the sign grid.</p> <p>Elevator Graphics</p> <p>00057</p> <p>All elevator graphics shall relate in size and location to the panels of the elevator cab. The graphics are to be proportioned appropriately with the rest of the elevator accessories and installed flush to the wall in vertical alignment with the accessories. The colors of the elevator graphics are to be dark grey letters on a light grey background.</p>

7.48 Location of power and communication  
receptacles

7.49 Location of linear diffusers in upgraded  
ceilings



7.48

Life Safety/Mechanical

All exposed mechanical/life safety devices shall be located in a uniform, logical, and consistent location and in a finish to match the surface to which it is installed. All systems in corridor ceilings shall occur in a single line centered on the corridor. Similarly, all devices in drywall ceilings shall be located in uniform, logical and consistent location in relation to the overriding governing grid in finish to match the ceiling. The following criteria shall apply:

#### Mechanical Grills

Mechanical grills inclusive of supply and return air are to be perforated covers in a size to match the ceiling tile in which they occur. Continuous linear slot diffusers shall be used in drywall ceilings. The trim of the slot diffuser and the nonactive length shall be painted a matt-black finish.

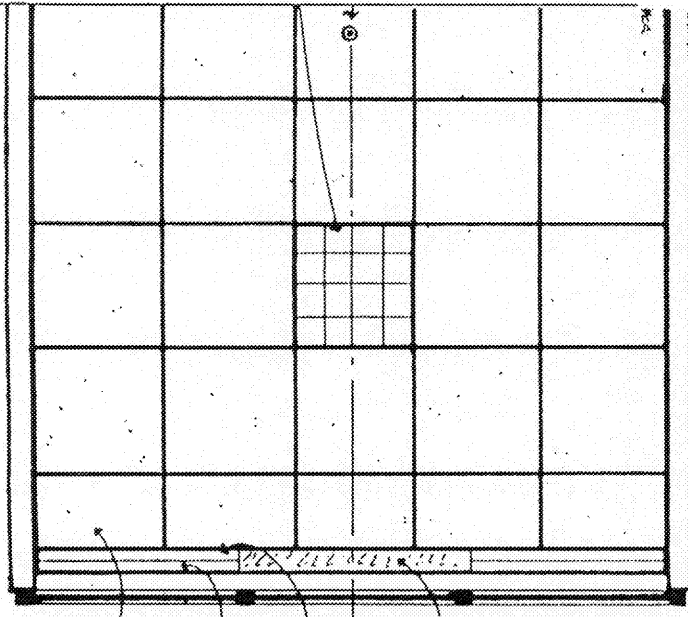
#### Speaker Covers

Speaker covers are to be no larger than 12" in diameter, centered in ceiling tile and installed flush to the ceiling.

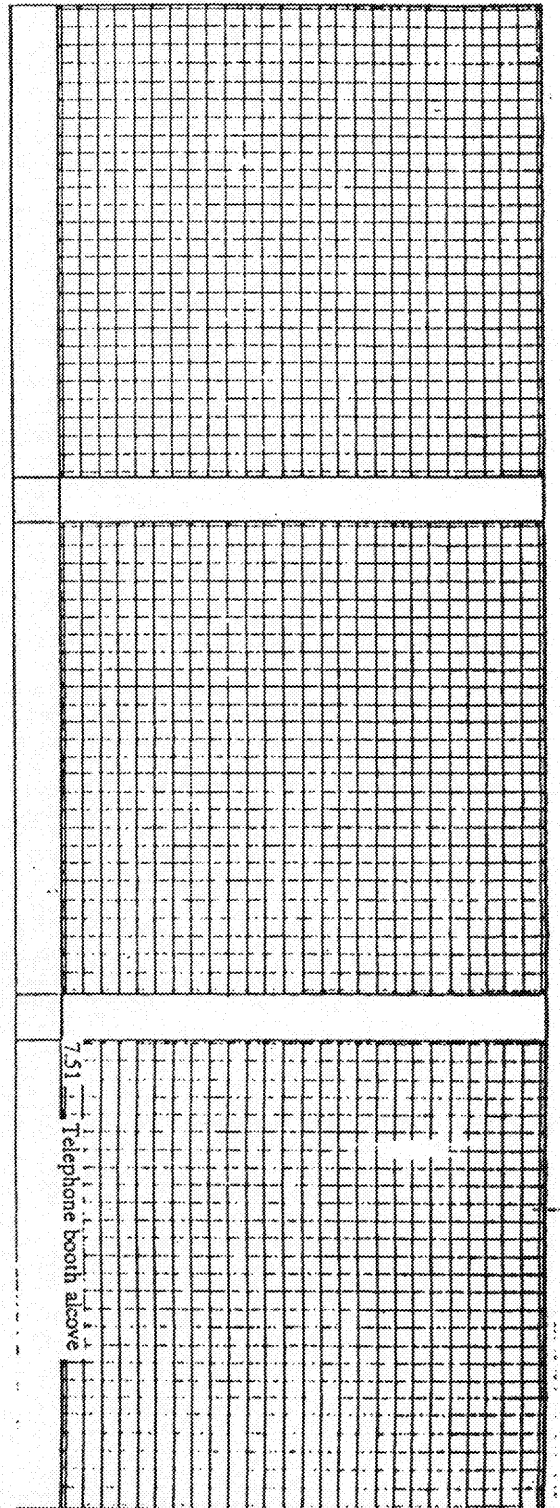
#### Sprinkler

00058

Sprinkler heads shall be recessed with the trim matching the color of the ceiling. All sprinkler heads are to be centered in the ceiling tile and aligned with the lighting grid.



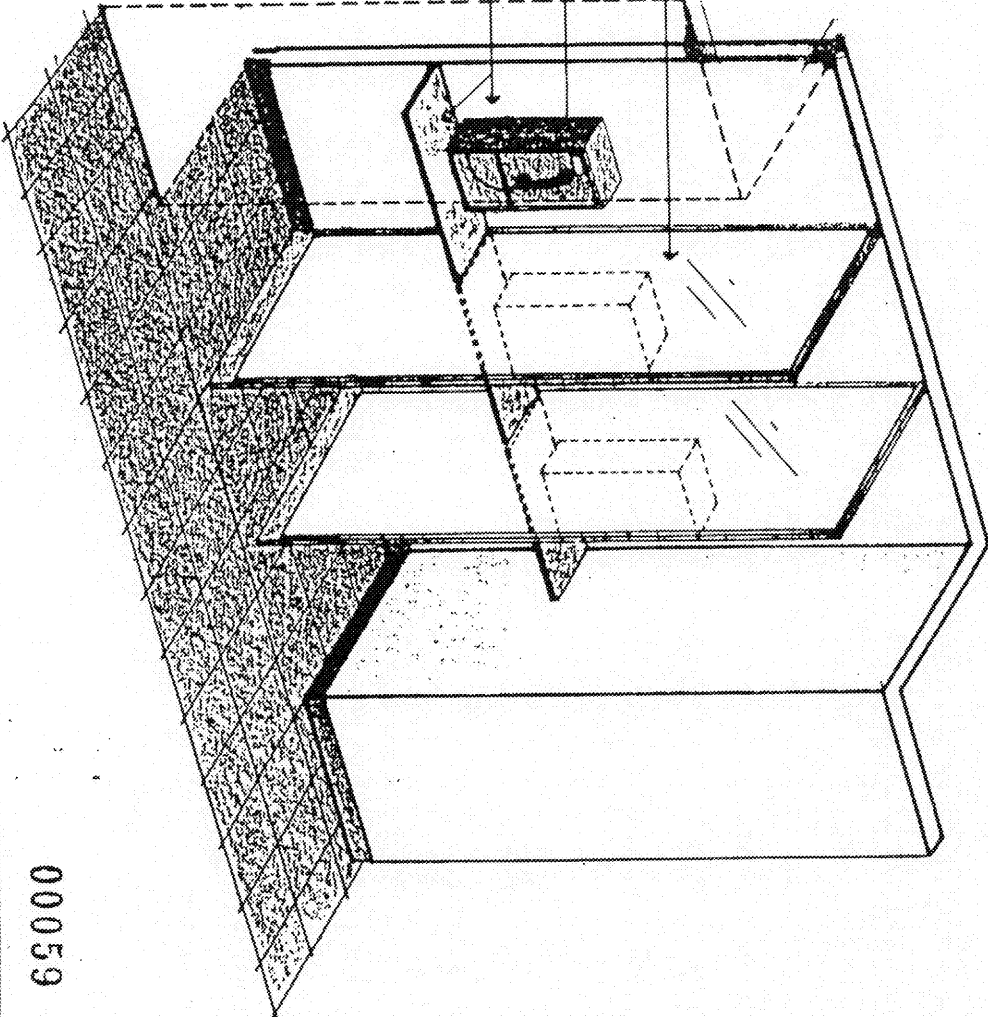
NONACTIVE LENGTH FTD. MATTE  
BLACK  
CONTINUOUS LINEAR SLOT  
DIFFUSER LOCATED AGAINST  
EXTERIOR WALL WHERE POSSIBLE  
TRIM TO MATCH COLOR OF  
CEILING  
SUSPENDED C.G. SYSTEM OR  
DRYWALL C.G.



GLASS PANEL WITH  
ALUMINUM TRIM

WALL MOUNTED TELEPHONE

BRUSHED ALUMINUM SHELF  
AND PANELS



00059



glass sides and top. Shelves are to be clear glass with minimal metal connectors. Manufacturers standard shelf brackets is not an acceptable solution. Standards shall be recessed with pin-mounted connectors.

In vending areas, machines shall be uniform in dimension if possible. Solid plastic laminate panels should be used when available. Should machines not extend the entire length of the wall, they are to be enclosed by full height partitions which extend 2" beyond the face of the machines. Dropped drywall soffits may also enclose the machines.

#### Personal Article Storage Units

Cadet personal article storage units shall be located in a logical, meaningful location in relation to plan and elevation. These units are to be constructed in textured plastic laminate and shall be in a color to match the adjacent wall surface. The storage units shall never be attached to any mosaic or accent wall.

#### Plants

The interior planting scheme of the Academy must be done in a single unified effort in order to achieve a consistent, logical, and harmonious plan in both plant location and type. Single individuals or departments shall not determine the planting for their immediate area. Plants generally shall be located in common areas in office spaces and be of a size appropriate to the surroundings. Small desktop plants are acceptable in private offices. Plants in public spaces shall be kept to a minimum and located in groupings, which can be highlighted by lighting. All plant types used

throughout the Cadet Area must be of a high grade tropical variety. All plant containers used throughout the Cadet Area must be white glazed resin pots. Hanging planters are not acceptable.

#### Artwork

All artwork in the Academy should become part of a unified program or collection. Artwork must be highlighted in public and common areas to unify all the buildings in the Academy.

Tasteful personal artwork is acceptable in private offices and in open office workstations. The artwork in open office workstations is not to be closer than 12" to the top or side of a panel.

All art acquisitions should have prior approval of the Fine Arts Committee.

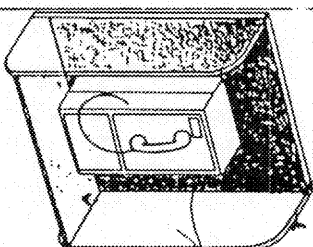
#### Moveable Partitions

Moveable partitions in conference rooms or other areas shall be a full height modular wall system in a finish to create visual and functional uniformity within the office environment. The modular wall system must meet the following criteria:

- Flexible ceiling and floor channels;
- Accommodate full power and communications distribution;
- Incorporate transoms, doors and hardware integral within the panel modularity;
- Meet a 44 STC rating.

The moveable partition shall be stored in a hidden pocket or closet behind the wall. The door to this closet must be flush with the wall.

CLEAR ACRYLIC  
SIDE PANELS  
BRUSHED  
ALUMINUM  
BACK PANEL  
AND SHELF



and the door must look as if it is a part of the panelized wall system.

#### Painting

All painting work, except as modified by governing code, should comply with the following Steel Structures Painting Council standards:

- SSPC "Good Painting Practice"
- SSPC "Systems and Specifications"

The Specular Gloss Range for each for paint type is determined in accordance with ASTM D523:

Sheen	Geometry/Deg	Gloss
Flat	85	Below 15
Eggshell	60	5 to 20
Semi-Gloss	60	30 to 65

The following sheen levels should be used on the following surfaces:

00060

- Flat: Ceilings
- Eggshell: Walls in Administration spaces, circulation paths, dorm rooms.
- Semi Gloss: Walls in instructional spaces, toilet, locker and shower rooms; all painted wood and metal surfaces; concrete masonry walls.

wall washers relating to the wall which they are lighting. Track lights shall be white and placed in a functional pattern relating to the governing grid. Emergency lights shall be integral in the fixtures. Neon lighting may be used for signage in dining areas, excluding Mitchell Hall. As lighting technology advances, better color rendering solutions and more efficient fixtures may supersede these lighting guidelines.

**Millwork**

All millwork shall comply with the applicable provisions and recommendations of AWI PREMIUM Quality Standards.

Integral bookcases, credenzas, and other units must be in a finish compatible with the quality level of the space in which they occur. In general, millwork shall be painted in a color to match the wall in which it occurs. Millwork in fabric walls must be either lacquer or wood veneer. Millwork shall be simple and rectilinear in form to be consistent with the interior architecture of the Academy. Where exposed hardware is required, it shall be purposeful and simple in form, with the material being metal. Millwork in veneer walls must be a consistent veneer throughout. Millwork must be flush with the front edge of the wall and separated by a 3/8" reveal along all edges. The base shall typically be the same height as the wall and be recessed. All hardware and fasteners shall be hidden, open bookcases are to provide holes and clips for adjustable shelves. Door pulls are to be "C-shaped". All exposed hardware shall be clear anodized brushed aluminum or stainless steel.

Millwork in support areas such as pantries, copy and cafe/restaurant areas shall be plastic laminate in a solid color. Wood grain plastic laminate is not acceptable anywhere in the Academy. All edges shall be separated from the wall which they occur by a 3/8" reveal. All edges must be square with hardware and fasteners hidden. Any trim is to match the plastic laminate in color and finish. The base must be recessed and equal in height to the adjacent wall base.

**Miscellaneous Items**

Miscellaneous items must relate to the governing grid in location, size, and shape. The quality levels of all miscellaneous items must be representative of the high quality and integrity of the Academy architecture.

**Ceiling fans:**

Ceiling fans are to be used only in non-air conditioned spaces. Fans must be removed from the space when it becomes air-conditioned. The fan shall be of a commercial/institutional quality with the following criteria:

- 3 blades
- White enamel
- No exposed hardware
- No light
- No pull connection

**Telephone Booths and Kiosks**

Freestanding telephone kiosks are to be simple rectilinear forms which relate to the governing

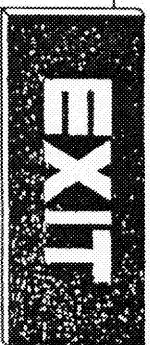
grid in both plan and elevation. Telephone booths mounted to walls must relate to the elevation in which it is placed in a logical, meaningful way. The proper location of these items are to be remote areas of public spaces so as not to impede circulation or call attention to themselves. The finish shall be either brushed aluminum in wall-mounted booths or clear glass with metal trim in freestanding kiosks. Telephones will never be attached to an accent wall. Telephone alcoves must be incorporated into new projects.

**Display Cases**

Display cases shall be rectilinear in form which relate to the governing grid in both plan and elevation. Display cases, in general, shall be located in populated areas in a manner that will not impede traffic. Display cases shall not be attached to mosaic walls.

00061

The material of freestanding units shall be a brushed aluminum or stainless steel base with



7.50 Typical ceiling hung exit sign

Switches and thermostats in veneer walls shall be painted black or to match the veneer color. Switches and thermostats are not to be installed on fabric wall panels.

Receptacles

Receptacles and telephone jacks are to be located in a thoughtful location in the elevation separated from each other by no more than 6". They should typically be mounted at 12" AFF in a stainless steel finish. In elevations which are fabric or veneer, receptacles are to be mounted sideways and located in the base. The centerline of the receptacle should align with the centerline of the panel. The finish is to be brushed aluminum and painted to match the color of the base.

Lighting 00062

All fluorescent fixtures are to be warm, color, corrective tubes. Cool white fluorescent is not acceptable. Fluorescent 4 foot lamps and U-tube lamps shall have cooler temperature of 3,000 degrees K, color rendering index shall be 80 or greater, and initial lumens output shall be greater than 2,900. Lighting in architectural covers must be continuous run fixtures in order to provide a uniform, uninterrupted appearance. All baffles are to match the color of the ceiling. Luminous ceilings are not allowed. Fluorescent fixtures located within suspended ceiling systems are to be deep 9-cell parabolic fixtures or polarized fixtures the same size as the tile in which they occur.

All downlights and wall washers are to be of a minimal aperture with a minimal frame. These

Access Panels

Access panels shall not be located in 1'x1' ceiling tiles. Miscellaneous ceiling plates and panels shall be avoided on walls. If needed, plates and panels can be added in walls to align with surroundings and the governing grid. If plates and covers are added in panel walls, they shall be used in a width to correspond with the full width of a panel and located at the top edge of the panel. If plates are smaller than the width of the panel, they should be centered on the panel.

There will be no exposed conduit except in service areas.

Exit Signage

Exit signage shall be ceiling hung side lit glass with minimal color graphics as allowed by code. The frame plate shall be flush with the ceiling and painted white.

Emergency Lighting

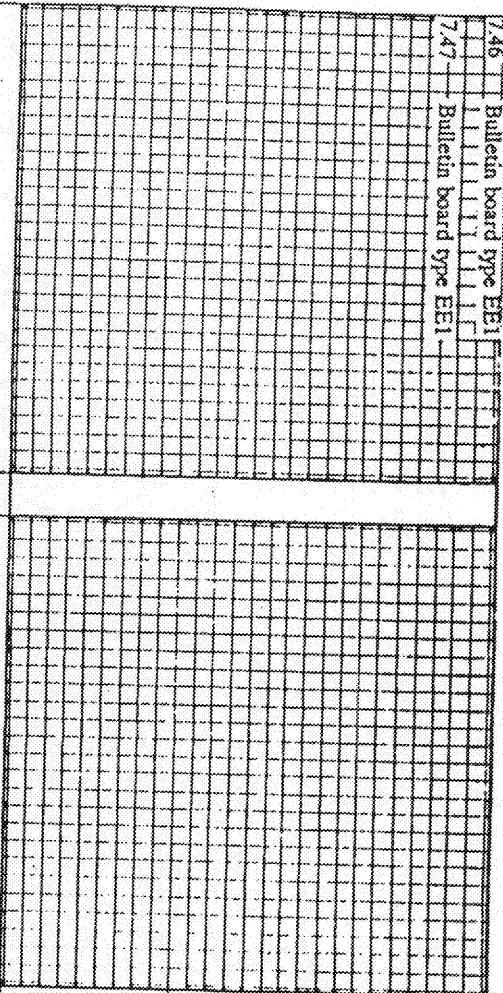
Emergency lighting shall be a standard fixture in the ceiling equipped with additional battery packs. No ceiling or wall-mounted devices are acceptable.

Switches and Thermostats

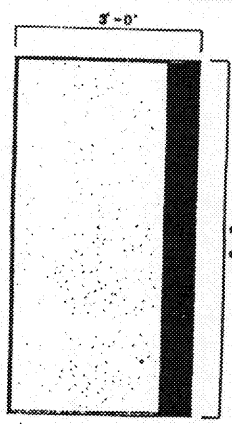
Switches and thermostats are to be grouped together, separated by no more than 6", located by the door entry and installed with centers in alignment. The mounting height is to match existing. The finish of switch covers should typically be stainless steel and thermostats shall



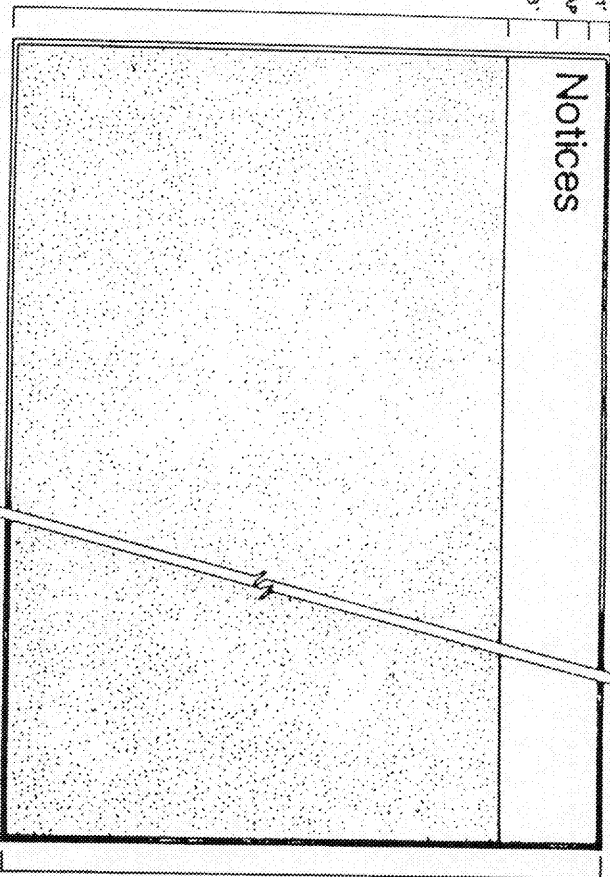
7.46 Bulletin board type EE1  
7.47 Bulletin board type EE1



7.46

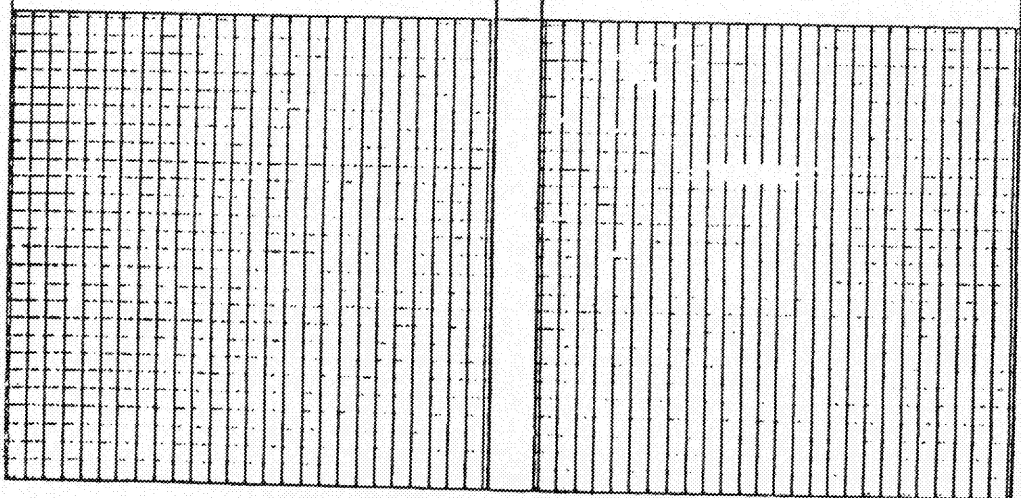


Notices



00063

7.47



Performance

The performance of building systems is the critical characteristic which determines suitability of use. The floors, walls, and ceilings must satisfy the following general criteria:

- Low maintenance/durable, long life span.
- The finishes shall be subject to life-cycle costing analysis.
- Technical Advancement. All materials and finishes shall be selected and assembled to create technically proven state-of-the-art interiors.

Standards

The following standards and codes are to be used as a guide for the design of all interior projects:

- DOD Construction Criteria Manual AFM 88-15
- Uniform Building Code
- National Fire Protection Association (NFPA)
- Occupational Safety and Health Administration (OSHA)
- 88-40 Air Force Pamphlet (for interior signage)
- Federal Accessibility Standards (ATBCB)

Wall Types

All walls typically shall extend to the underside of the ceiling. A continuous 3/4" extruded aluminum reveal at the top edge shall occur only at colored entry walls in building lobbies. These walls shall also have a 3/8" extruded aluminum reveal on either side. The reveals shall be in a finish to match the wall.

For reasons of confidentiality or sound control, some walls must extend to the underside of the structure. The functions requiring full height partitions are as follows:

- Instructional classrooms and laboratories
- Conference rooms
- Private offices for high level personnel
- Gymnasiums
- Cadet rooms

In locations where concrete unit masonry (CMU) walls are required, a standard nominal 16" long x 8" high unit, scored in center or stacking, with exposed faces of a standard color and texture are to be used. The grout line is to be no larger than 3/8". Special shapes must be used to build corners, jambs, control and expansion joints to provide a complete installation in accordance with the highest standard of workmanship.

Window Treatment

00064

Window treatment in upgraded areas is to be a variable shading system incorporating a thermorel shade in various densities dependent on location.

The shading system shall meet the following criteria:

- Inside window mullion mounting to provide convective air flow at bottom of shade;
- Manual and electric control systems;
- Reduction of energy expenditures for lighting and air conditioning;
- Uniform shade alignment, creating consistency in design, both exterior and interior;
- Black-out/room darkening shade capability where required;
- Flush metal fascia or recessed head pocket.

Horizontal mini blinds shall be fixed at bottom rail to provide conformity to building exterior. All horizontal multi-blinds, on interior glazing as well as perimeter wall glazing, shall be recessed at the head pocket with a fixed bottom rail, and shall be white with a grey tint.



Lobby (Secondary)

A. Flooring	Carpet medium tone, or 12" x 12" composite floor, medium value.
B. Base	4" high straight rubber base, black.
C. Walls	Corridor vestibules: Uniform material, light value. Wall plane: Gypsum board painted primary color to designate building type.
D. Ceiling	Product equal in composition and finish to Armstrong Citrus Tegalur One Step ceiling panels 2'x2' with 9/16" white grid.
E. Typical Doors and Frames	Wood doors/metal frames painted black
Elevator Cabs	
A. Flooring	Carpet, medium tone.
B. Base	
None.	

C. Walls

D. Ceilings	Plastic laminate panels, textured, light grey tone with aluminum trim or painted to match walls.
E. Doors & Frames	Stainless steel #4, nondirectional
F. Handrails & Accessories	Stainless steel #4, nondirectional
A. Flooring	Instructional: 12" x 12" composite tile, light value. Administrative: Carpet, medium tone. Athletic facilities: Identical to instructional or concrete.
B. Base	4" rubber base, black or grey.
C. Walls	Typical walls: Uniform material, light value.

Entry plane: Uniform material and color, color medium value to designate building type.

D. Ceilings	Glue-in application of 12" x 12" concealed spline or product equal in composition and finish to Armstrong Citrus Tegalur One Step ceiling panels, 2'x2' with 9/16" white grid.
E. Doors & Frames	Typical: Wood doors/metal frames, painted black or grey. Upgrade: Wood veneer doors/metal frames painted black
A. Flooring	Carpet, medium tone.
B. Base	Typical: 4" rubber base, black or grey. Upgrade: 4" recessed wood base, painted color to match fabric panels or 4" recessed wood veneer base to match paneling.
	High level administration spaces available to public: 4" recessed rubber base, black.

00071





GENERAL AREAS		
Instructional Spaces		
A. Flooring	Typical: 12" x 12" composite tile, light tone. Labs: 12" x 12" composite tile, or synthetic poured floor, light tone. Lecturnars and lecture halls: carpet, medium tone.	
B. Base	4" rubber base, medium to dark value.	
C. Walls	Separate rooms: Uniform material, light value. Corridor vestibules: Typical uniform material, light value. Vestibule plane: Uniform material, medium in value.	
D. Ceiling	Product equal in composition and finish to Armstrong Cirrus Tegalur One Step ceiling panels, 2x2' with 9/16" white grid. Upgrade: Gypsum board, painted white.	
E. Doors & Frames		
Wood doors/metal frames, painted medium value.		
Coffee/Copy Rooms		
A. Flooring	12" x 12" composite tile, light tone.	
B. Base	4" rubber base - black or grey.	
C. Walls	Vinyl acrylic tone on tone texture or paint, light or medium tone.	
D. Ceilings	Product equal in composition and finish to Armstrong Cirrus Tegalur One Step ceiling panels, 2x2' with 9/16" white grid.	
E. Doors and Frames	Typical: Wood door/metal frame, painted medium value. Upgrade: Wood veneer doors/metal frames, painted black.	
Perma-edge moldings by Wilsonart.		
Toilet Rooms		
A. Flooring	Typical: 2" x 2" ceramic tile, solid color, medium or dark tone. Upgrade: Terrazzo resin matrix, medium or dark tone.	
B. Base	Typical: 2" x 2" ceramic tile, solid color, medium or dark tone to match floor. Upgrade: Terrazzo resin matrix, medium or dark tone.	
C. Walls	Typical: Gypsum board, painted, tone on tone vinyl texture or vinyl wall covering. Wet wall: 1x2" ceramic tile, installed vertically, solid color, light tone.	
D. Ceilings	Gypsum board, painted, white.	
E. Doors and Frames	Wood doors/metal frame, painted medium value.	

00073

<p>Upgrade: Wood veneer doors/metal frame, painted black.</p>	<p>Locker/Shower Rooms</p>	<p>Shower: 1x 2" ceramic tile, installed vertically, solid color, light tone.</p>
<p>F. Vanities</p> <p>Typical: Solid surfacing material light tone, with integral bowl.</p>	<p>A. Flooring</p> <p>2x2" ceramic tile, solid color, medium or dark tone.</p>	<p>Typical: Gypsum board, painted, white.</p>
<p>Upgrade: Georgia Cherokee Select or visually equal white marble with recessed stainless steel bowls.</p>	<p>B. Base</p> <p>2x2" ceramic tile, solid color, medium or dark tone to match floor.</p>	<p>E. Vanities</p> <p>Integral with solid surfacing material, light tone, or white porcelain self-trimming bowls.</p>
<p>G. Toilet Partitions</p> <p>Typical: Ceiling hung toilet partition, baked enamel, white or light grey; wall mounted toilet.</p>	<p>C. Walls</p> <p>Wet walls</p> <p>1x2" ceramic tile, installed vertically, solid color, light tone.</p>	<p>F. Doors &amp; Frames</p> <p>Wood doors/metal frame, painted medium value.</p>
<p>Athletic facilities, dorms, instructional areas: floor mounted toilet partition, baked enamel, white or light grey; floor mounted toilet.</p>	<p>Typical: Gypsum board or CMU, painted or vinyl tone-on-tone texture, light tone.</p>	<p>Fieldhouse * Walls: Light grey. Truss work: Medium blue-grey</p>
<p>Upgrade: Brushed aluminum toilet partitions.</p>	<p>Typical Upgrade: 1x2" ceramic tile, installed vertically, solid color, light tone.</p>	<p>00074</p>
<p>H. Accessories</p>	<p>D. Ceilings</p>	
<p>Stainless steel</p>		

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# CONTROL TOWER USAF ACADEMY CID FURNITURE REQUIREMENTS

Executive column when marked indicates that an executive line of furniture is required. Coordinate specifics and required furniture features and characteristics with the User. In addition to items included in the following furniture list, artwork and artificial plants shall also be included in the CID.

## Room 102: LOBBY

<u>QUANTITY</u>	<u>EXEC.</u>	<u>FURNITURE ITEM</u>
3	X	Two-Seater
3	X	End Table

## Room 105: BRIEFING

<u>QUANTITY</u>	<u>EXEC.</u>	<u>FURNITURE ITEM</u>
60		Chair wo/Arms
1		Lectern

Drapery with Black-Out Lining shall be provided. Coordinate with drapery hardware requirements.

## Room 107: BRIEFING SUPPORT

<u>QUANTITY</u>	<u>EXEC.</u>	<u>FURNITURE ITEM</u>
1		Table for Computer
1		Desk Chair w/Arms

## Room 109: TRAINING AND STANDARDIZATION NCO OFFICE

<u>QUANTITY</u>	<u>EXEC.</u>	<u>FURNITURE ITEM</u>
1		Double Pedestal Desk
1		Kneespace Credenza with Keyboard
1		Hutch w/Doors (to fit 19 inch monitor)
2		Side Chairs w/Arms
1		Desk Chair w/Arms
1		Audio Visual Cabinet for 533mm (21") TV

### **Room 110: CHIEF CONTROLLER OFFICE**

<u>QUANTITY</u>	<u>EXEC.</u>	<u>FURNITURE ITEM</u>
1	X	Double Pedestal Desk
1	X	Kneespace Credenza with Keyboard
1	X	Hutch w/Doors to fit 482mm (19") monitor
2	X	Side Chairs w/Arms
1	X	Managerial Chair
1	X	Bookcase (4 shelves)

### **Room 111: STORAGE ROOM**

<u>QUANTITY</u>	<u>EXEC.</u>	<u>FURNITURE ITEM</u>
1		Bookcase (4 shelves)
2		Double Door Office Supply Cabinets.

### **Room 113: CONFERENCE ROOM**

<u>QUANTITY</u>	<u>EXEC.</u>	<u>FURNITURE ITEM</u>
1	X	Conference Table (to seat 12 people)
12	X	Conference Chairs
9	X	Perimeter Seating (13 preferred)
1	X	Audio Visual Cabinet for 812mm (32") TV
1	X	Marker Board (6' wide)
1	X	Credenza/Support Table

### **Room 114: OPEN OFFICE**

<u>QUANTITY</u>	<u>EXEC.</u>	<u>FURNITURE ITEM</u>
1		Computer Stand (to hold 2 printers, 1 Fax, and 1 scanner) **SAME AS WS1?*
8		Desk Chairs w/Arms
6		Furniture System Workstations 1828x2438mm (6' W x 8' D)

### **Room 126: CADET FLIGHT COMMANDER**

<u>QUANTITY</u>	<u>EXEC.</u>	<u>FURNITURE ITEM</u>
1		Double Pedestal Desk
1		Kneespace Credenza with Keyboard
1		Hutch w/Doors (to fit 19 inch monitor)
3		Desk Chairs w/Arms
2		Computer Testing Workstations (with P/B/F Pedestal and Overhead Storage)
1		Bookcase (4 Shelves)

### **Rooms 131 and 132: SUB-BRIEFING (Each)**

<u>QUANTITY</u>	<u>EXEC.</u>	<u>FURNITURE ITEM</u>
4		Table to seat 3 people
12		Chair w/Arms
4		Marker Board (4 feet wide)
1		Partition to Separate the Areas

### **Room 133: BREAK ROOM**

<u>QUANTITY</u>	<u>EXEC.</u>	<u>FURNITURE ITEM</u>
4		Table, Round to Seat 4 People
16		Chair wo/Arms
1		Magazine Rack
1		Refrigerator
1		TV (wall mount)

### **Room 134: LOGGER ROOM**

<u>QUANTITY</u>	<u>EXEC.</u>	<u>FURNITURE ITEM</u>
2		Mobile P/B/F Pedestals
4		Desk Chairs w/Arms

### **Room 135: ROPE ROOM**

<u>QUANTITY</u>	<u>EXEC.</u>	<u>FURNITURE ITEM</u>
1		Double Door Office Supply Cabinet
1		Non-Flammable storage locker (yellow)

### **Room 401: OBSERVATION DECK/CONTROLLER BREAK AREA**

<u>QUANTITY</u>	<u>EXEC.</u>	<u>FURNITURE ITEM</u>
1		Refrigerator (small, locate at break area cabinetry)
1	X	Table (to seat 6 people)
6	X	Chairs wo/Arms
1	X	Credenza/Support Table

Drapery with Black-Out Lining shall be provided. Coordinate with drapery hardware requirements.

### **Room 601: CAB**

<u>QUANTITY</u>	<u>EXEC.</u>	<u>FURNITURE ITEM</u>
15		Chairs (Coordinate height and type with Contracting Officer and Control Cab height)
1		Refrigerator (small, locate at "break area" on south wall)

# **ATTACHMENT NO. 5**

## **10<sup>TH</sup> COMM SQUADRON SYSTEM & CABLE SPECIFICATION**

**10TH COMMUNICATIONS  
SQUADRON**

**SYSTEMS AND CABLE  
SPECIFICATIONS**

**30 OCT 98**

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## 1.0 TELEPHONE AND DATA SYSTEMS SPECIFICATIONS

### 1.1 OVERVIEW

This section provides procedures and specifications for installing telephone and data wiring for all facilities at the USAF Academy. All future building construction and renovations must meet these standards

### 1.2 REFERENCES

Electronic Industries Association/Telecommunication Industries Association (EIA/TIA)  
568-A, 569, 570, 606, 607, TSB-67 and TSB-72.

REA Specification for Filled Telephone Cables (PE-39)

Totally Filled Fiber Optic Cable (PE-90)

The National Electrical Code (NEC)

Air Force T.O. 31W3-10-14 - Air Force Communications Engineering and Installation  
Standard, Standard Installation Practice, Outside Plant, Cable Termination

Air Force T.O. 31W3-10-22 - Signal Manual, Telecommunications Engineering, Outside  
Plant, Telephone

Air Force T.O. 31-10-24 - Installation Practices: Communications Systems Grounding,  
Bonding, and Shielding

### 1.3 HORIZONTAL WIRING

1.3.1 The horizontal wiring is the portion of the telecommunications wiring system that extends from the users' work area telecommunications outlet to the telecommunications closet. The horizontal wiring includes the telecommunications outlet in the work area, the mechanical terminations for the horizontal cables, and the cross-connections located in the telecommunications closet. There should be a minimum of one telecommunications closet per floor of each building.

1.3.2 The following list of common services and systems should be considered when the horizontal wiring is designed (*this list is not intended to be all inclusive*):

- Voice telecommunications services

- Data communications

- Video communications

1.3.3 In addition to satisfying today's telecommunications requirements, the horizontal wiring must facilitate ongoing maintenance and relocation **and accommodate future equipment and service changes**. The horizontal wiring contains the greatest quantity of individual cables for the building. After construction of the building, the horizontal wiring is often much less accessible than the backbone wiring. The time, effort, skills, and cost required for changes can be extremely high. Additionally, access to the horizontal wiring frequently causes disruption to occupants and their work on that floor of the building.



These factors make the choice of horizontal cable types and the layout **very important** to the design of the building wiring. Consideration should be given to accommodating a diversity of user applications in order to reduce or eliminate the probability of requiring changes to the horizontal wiring to meet a future requirement.

1.3.4 The proximity of horizontal wiring to electrical facilities that generate high levels of EMI (electromagnetic interference) shall be taken into account. Motors and transformers used to support the building mechanical requirements and copiers used in the work area are examples of these types of sources. Every effort will be made to avoid these and other EMI sources.

1.3.5 Topology: The horizontal wiring shall be a star topology, that is to say each work area telecommunications outlet shall be connected **directly** to a telecommunications closet (also known as a "homerun").

1.3.6 Horizontal distances: The maximum horizontal cable distances shall be 90 meters or 295 feet, independent of media type, from telecommunications closet to the telecommunications outlet.

## **1.4 GROUNDING CONSIDERATIONS**

Grounding shall meet the National Electrical Code (NEC), Air Force T.O. 31-10-24, Installation Practices: Communications Systems Grounding, Bonding, and Shielding, requirements and practices except where authorities or codes impose a more stringent requirement or practice.

## **1.5 INTRA-BUILDING CABLE SPECIFICATIONS**

### **1.5.1 Copper Cable**

1.5.1.1 The following are the only copper cables that are recognized in the USAFA horizontal wiring systems:

1.5.1.1.1 Four pair 100 ohm unshielded twisted pair (UTP) cables Category 3 and 5.

1.5.1.1.2 Plenum rated Category 3 and 5 for use in plenum areas, as defined by civil engineering design standards.

1.5.1.2 Category 1 and 2: are not recognized in the ANSI/EIA/TIA 568-1991 standards.

1.5.1.3 Category 3: specified up to 16 MHz and used for voice only.

1.5.1.4 Category 5: specified up to 100 MHz and are intended to be used for high-speed data rates up to 100Mb per second.

## 1.5.2 Fiber optic cable specifications to interconnect telecommunications closets:

1.5.2.1 Minimum 12 multi-mode fibers.

1.5.2.2 Size: 62.5/125um multi-mode.

1.5.2.3 Maximum cable attenuation: 850 nm is 3.75 dB/km; 1300 nm is 1.50 dB/km.

1.5.2.4 Minimum cable bandwidth-product: 160 - 500 MHz at 850 nm and 1300 nm over full temperature range.

1.5.2.5 Each fiber shall be in a tight tube buffer.

1.5.2.6 Each fiber cable that will be used in a plenum area must be made of flame retardant (floropolymer or equivalent) sheath, which complies with the National Electrical Code (NEC) for plenum cables for use in building plenum areas without the use of metallic conduit in ducts between and within buildings, up riser shafts, and under computer room floors.

1.5.2.7 Fiber will be installed in a cable tray. Cable tray will be a minimum of 12 inches wide and will be installed prior to installation of cable. Whenever fiber cable exits a cable tray, it will be installed in flexible conduit and fully supported.

1.5.2.8 There must be four feet of unsheathed buffered fiber neatly coiled inside the patch panel. There must be a 50-foot maintenance coil at each end of fiber cable and on both sides of a fiber cable splice. Tie wraps will not be used on fiber optic buffers. Tie wraps can be used on the exterior sheath as long as tension does not cause any microbending of fibers or bending or indentations of the sheath. Innerduct is to be used whenever possible. Tie wraps may be used on innerduct. The minimum fiber optic cable bend radius, which is a minimum bending radius of 10 times the O.D. of the cable, must not be exceeded.

1.5.2.9 Installer will install standard 19" rack and fiber patch panels and will terminate the fiber in the patch panel.

## 1.5.3 Cable Labeling

1.5.3.1 Fiber cables: both ends of fiber cable must be labeled with building number, room number, and fiber number.

1.5.3.2 Category 5 and 3 cables: both ends of Category 5 and 3 cable must be labeled with room number and jack number. Category 5 jacks will be designated as D for data. Category 3 jacks will be designated V for voice. (e.g. 102-1V, 102-2D).

1.5.3.3 Jack plates: plates must be labeled with jack number.

1.5.3.4 Labels: labels must be permanently affixed and not easily detached or smeared. Cable labels must be at least 18 inches from the end of the cable to allow maintenance cuts.

1.5.3.5 Patch panels: Front panel will be labeled to show room and drop number.

#### 1.5.4 Cable Testing and Documentation

Testing shall be accomplished on all fiber optic and copper cables after installation. Fiber will be tested at 850 and 1300 nm. Documented post installation fiber optics and copper test results will be provided to SCMT. Certification testing of Category 5 systems is required to 100MB / second data rates. It is recommended that Category 5 cable be installed by a BLCSA.

#### 1.5.5 Telecommunications outlets

1.5.5.1 The standard telecommunications outlet configuration for a typical office is one dual outlet for every 50 sq. ft. of workspace.

1.5.5.2 At a minimum, one outlet will be wired for voice with Category 3 cable and one outlet will be wired for data with Category 5 cable or both can be wired with Category 5 cable.

1.5.5.3 The outlet faceplate must be labeled with room number and jack number.

1.5.5.4 Additional outlets may be required for administrative areas or for computer, modem, fax, or dorm requirements where more than one user occupies an area.

#### 1.5.6 Connector Specifications

1.5.6.1 Category 3 100-ohm UTP Cable: each four-pair voice cable shall be terminated in an eight pin flush mounted modular jack (RJ-45) with EIA/TIA 568b pin out, AT&T M11BH or equivalent.

1.5.6.2 Category 5 100-ohm UTP Cable: each four-pair data cable shall be terminated in an eight pin flush mounted modular jack (RJ-45) with EIA/TIA 568b pin out, AT&T M100CH or equivalent. The termination of a Category 5 cable is very important to maintain performance. The cable sheath must not be stripped any further than necessary for termination and the individual cable pairs must not be un-twisted more than 1/2 inch from the termination.

### 1.6 INTER-BUILDING CABLE SPECIFICATIONS

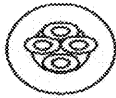
1.6.1 Fiber optic cable will be used to provide building-to-building communications infrastructure.

1.6.1.1 Size: 8.3/125um single-mode cable. Multi-mode cable, when used, shall have a core diameter of 62.5/125um.

1.6.1.2 The selection of multi-mode or single-mode fiber will depend on the distance of the cable run and planned usage.

1.6.1.3 A minimum of 12-fibers will be installed.

1.6.1.4 Fiber optic cable shall be jelly-filled and contain an armor shield for additional protection. In an underground environment, innerducts will be installed prior to the installation of fiber optic cable, using a sufficient quantity of 1" inner diameter innerducts to fill the duct. See example illustration below.



1.6.1.5 At a minimum, 25 feet of fiber optic cable will be coiled at terminal locations and spliced to serve as maintenance loops. Additional maintenance loops may be specified at certain locations.

## 1.6.2 Cable Testing and Documentation

Testing shall be accomplished on all fiber optic and copper cables after installation. Fiber will be tested at 850 and 1300 nm. Documented post installation fiber optics and copper test results will be provided to SCMT.

## 1.7 CONDUIT

1.7.1 Conduit is required for all interior wiring to protect the integrity of the cable distribution system and to allow for ease of maintenance and installation. The following are the sizes required:

Cable Size (24AWG)	Conduit Size
8-pair	3/4"
16-pair	3/4"
24-pair	1"
32-pair	1 1/4"

1.7.2 All interior conduits will run continuously from telecommunications outlet to nearest cable tray or telecommunications closet.

1.7.3 Exterior conduits should be a minimum 4-inch inside diameter PVC with pull string. Conduits must be installed in pairs and buried at a depth of 2 to 3 feet with an orange warning tape buried 1 foot above the top conduit.

1.7.3.1 Two conduits should be installed at each end of road and paving projects.

## **1.8 TELECOMMUNICATIONS CLOSETS**

1.8.1 A telecommunications closet is an area within a building set aside for the exclusive purpose of housing equipment associated with the telecommunications wiring system. Every building shall contain at least one telecommunications closet or equipment room on each floor of the building. There is no upper limit on the number of telecommunications closets that may be provided within a building.

1.8.2 Three possible applications of a telecommunications closet are given below:

### **1.8.2.1 Horizontal/Backbone Connection**

The telecommunications closet shall contain the mechanical termination for a portion of the horizontal wiring system and a portion for the backbone wiring system. In this usage, the telecommunications closet shall provide facilities (space, power, grounding, etc.) for passive (cross-connect) or active devices or both used to interconnect the two systems.

### **1.8.2.2 Backbone Wiring Systems Interconnection**

The telecommunications closet may also contain the intermediate cross-connect for portions of the backbone wiring system. In this usage, the telecommunications closet shall provide facilities for the passive or active devices or both used to interconnect two or more portions of the backbone wiring system.

### **1.8.2.3 Entrance Facilities**

A telecommunications closet may be used to contain the demarcation point or an interbuilding entrance facility. In this usage, the telecommunications closet shall provide facilities for active and/or passive devices required to interconnect the demarcation point or interbuilding entrance facility or both to the telecommunications wiring system.

1.8.3 The following specifies the requirements for telecommunications closet design:

1.8.3.1 Each telecommunications closet should have a full (4'x8'x1/2") sheet of plywood, as a minimum, depending on the size of the room and the projected equipment installation, mounted on the wall.

1.8.3.2 The Category 3 voice cable will be mounted on 66 or 110 type connecting blocks and the Category 5 data cable will be terminated on a Category 5 patch panel, wall or rack mountable.

1.8.3.3 Additionally, for the main telecommunication closet in each building, the following is required:

1.8.3.3.1 Mount a full (4'x8'x1/2") sheet of plywood on each wall.

1.8.3.3.2 Minimum of two 4-inch inside diameter conduits are required to be run from the building's main telecommunications closet to the main telecommunications closets on each floor. The appropriate cable size for one conduit will be determined by the engineer and confirmed during project reviews. The second conduit shall be vacant and equipped with a 1/4 inch polypropylene pull rope.

1.8.3.3.3 For the telephone entrance conduits into the building maintain a minimum bend radius of 40 inches, locate ducts 2 inches from wall, and stub up conduits 6 inches above floor and finish with bushings. A minimum of two entrance conduits will be installed. For larger buildings, more conduits will be required.

1.8.3.3.4 D-rings and spools will be provided to allow cross-connects to be installed from existing termination blocks to newly installed termination blocks.

1.8.4 Backbone cable (also known as "Tie cable" or "Riser cable")

1.8.4.1 Where more than one telecommunications closet is required on a floor, each telecommunications closet shall be interconnected by a minimum of 12-62.5/125 um fibers for data use.

1.8.4.2 Backbone cable will be installed between the horizontal cable and the main telephone closet. Category 3 voice cable will be used for backbone cable. Backbone cable will be sized to provide the capability to cross-connect 100% of the installed horizontal cable from the communications closet to the main communications closet. Backbone cable will be terminated on 66 or 110 type blocks.

## **2.0 BROADBAND CABLE SYSTEMS SPECIFICATIONS**

### **2.1 OVERVIEW**

This section provides procedures and specifications for installing broadband coaxial television cable and systems for all facilities at the USAF Academy. All future building construction and renovations must meet these standards.

## **2.2 REFERENCES**

FCC Rules and Regulations, including 47 CFR Part 76  
National Electrical Code 1984, NFPA # 70, 84  
National Electrical Safety Code, ANSI-C2  
AFR 88-15, AF Design Manual—Criteria and Standards for AF Construction  
AFOSH Std 127-66, General Industrial Operations  
AFR 70-3 (AFI 64-101), Cable Television (CATV) System Installations

## **2.3 DESIGN CRITERIA FOR CATV SYSTEMS**

- 2.3.1 Provide direct change over to distribute all available channels provided by local CATV company.
- 2.3.2 Reception of color and monochrome television signal at any outlet in the system equal to that obtainable by single standard receiver connected directly to CATV service.
- 2.3.3 Equipment capable of providing two-way communication over single cable, when required.
- 2.3.4 Bandwidth of passive devices: from 5 to 650 MHz
- 2.3.5 Bandwidth of amplifiers: from 54 to 650 MHz in forward direction. If required, from 5 to 30 MHz in reverse path.
- 2.3.6 Design system for minus 57 dB cross modulation, or better, and a carrier-to-noise ratio of at least 46 dB.
- 2.3.7 System and component radiation not to exceed following limits:
- |                    |                       |
|--------------------|-----------------------|
| 5 MHz to 54 MHz    | 15 uV/meter at 100 ft |
| 54 MHz to 216 MHz  | 20 uV/meter at 10 ft  |
| 216 MHz to 650 MHz | 15 uV/meter at 100 ft |
- 2.3.8 Isolation between any two outlets in system: minimum 26 dB on any frequency between 10 and 260 MHz and minimum 20 dB over total range of 5 to 650 MHz.
- 2.3.9 All outlets in system provide minimum level of +3 dBmV and maximum level of +12 dBmV.
- 2.3.10 RF level difference between two adjacent channels: not greater than 2 dBm.

## **2.4 SUBMITTALS**

- 2.4.1 Provide riser diagrams and system data. (AutoCAD Drawing)

2.4.2 Equipment design considerations for future expansion, when requested.

2.4.3 Product data: Provide technical data on each product.

2.4.4 Description of system operation.

## **2.5 TEST REPORTS**

2.5.1 For each tap-off, list results of performance test. Provide:

2.5.1.1 Measured signal strength.

2.5.1.2 Signal-to-noise ratio

2.5.1.3 Color picture quality with respect to existence of snow, reflection, smear, or other picture degradation.

2.5.1.4 Each tap-off location identified by room number.

2.5.2 Send complete results of test to owner.

2.5.3 Correct any system deficiencies and re-test until system complies.

2.5.4 Provide complete and updated system cable drawings in both paper and electronic format (AutoCAD preferred) to owner.

## **2.6 GUARANTEE/WARRANTY**

2.6.1 Provide joint written guarantee by contractor and manufacturer.

2.6.2 Include one-year full-covering maintenance, including all materials and labor required to provide consistent peak performance of system.

2.6.3 Provide available maintenance on contract or call basis from local service organization.

## **2.7 SYSTEM DESIGN/OPERATION**

2.7.1 Provide homerun cable from each floor to the communications closet where CATV service enters the building.

2.7.2 Homerun cable from each communications closet taps to each room outlet. If one cable backbone is used, taps must be used to distribute signal to each room outlet.



2.7.3 Each cable outlet in rooms will meet signal level specification of +3 to +12 dBmV.

2.7.4 RG-11/540 QR or equivalent coaxial cable is used for backbone run and RG-6 is used for distribution to service outlets.

2.7.5 Input and output impedance: 75 Ohm.

2.7.6 Type F screw-on output connectors.

2.7.7 Type F screw-on connections for securing riser cable on rear of tapoff receptacle.

2.7.8 Provide device plates to match other plates in building or same type used on military installation. Type F screw-on connectors will be mounted in faceplates. The Falcon TV stainless steel 1 gang cover plates will have 2 holes centered top to bottom left to right and separated by no less than 1-1/4" of hole centers. The plates will have RF splice connectors installed.

## **2.8 TV SYSTEM OPERATION SPECIFICATIONS**

2.8.1 Provide reception and distribution to locations of receiving sets to include:

2.8.1.1 All locally available commercial color and monochrome broadcast VHF and UHF TV channels and all CATV channels.

2.8.1.2 Provide system for use with standard EIA color and monochrome TV receivers.

2.8.1.3 Allowing for additional channels without change to any components except head-end equipment.

2.8.1.4 Passing all channels without noticeable degradation of intelligence and color fidelity and for proper connection of standard EIA color and monochrome TV receivers.

2.8.2 Deliver minimum of 3000 micro-volts at 75 ohms RMS color signal strength to each outlet on every TV channel in system. Provide higher signal levels when test indicates direct pickup is a problem.

## **2.9 MATERIALS**

2.9.1 Provide complete backbox, chassis, faceplate, wiring, etc., tap-off for all RF television receiver locations.

2.9.2 Provide equipment inherently stable to changes in temperature and supply voltages variations.

2.9.3 Amplifiers and components: use heavy-duty hospital type and that are completely transistorized.

#### 2.9.4 Manufacturers

2.9.4.1 Acceptable TV system components manufacturers: (1) Blonder-tongue, (2) RCA, or (3) Jerrold.

2.9.4.2 Manufacturer must have established reputation and experience in production of device for five years with satisfactory service.

2.9.4.3 Manufacturer must have a local service organization.

### 2.10 ELECTRONIC COMPONENTS

#### 2.10.1 Amplifiers

2.10.1.1 Provide broadband amplifier for first major amplification of signals after introduction into preamplifiers and converters.

2.10.1.2 Broadband amplifiers: designed to minimize harmonics and beats.

2.10.1.3 Conform to FCC regulations.

2.10.1.4 Adapt for rack mounting.

2.10.1.5 Frequency range: 50 to 650 MHz.

2.10.1.6 Gain: 36 to 51 dB.

#### 2.10.2 Output tap-off devices

2.10.2.1 All channel, duplex receptacle type for mounting in single or 2-gang electrical box.

2.10.2.2 Contain necessary circuitry for connecting TV receivers to riser cable with required isolation, limited radiation, and nominal insertion loss of 0.60 dB.

#### 2.10.3 Splitters/Taps

2.10.3.1 Self-contained units with "F" type screw-on connectors.

2.10.3.2 Insertion loss: not more than 4.0 dB for two-way and 7.0 dB for four-way.

2.10.3.3 Isolation between outputs: at least 21.0 dB.

2.10.3.4 Meet FCC shielding requirements.

## **2.11 COAXIAL CABLE SPECIFICATIONS**

2.11.1 RF transmission cable with characteristic impedance of 75 ohms (RG-6 or equivalent).

2.11.2 Outside diameter: 0.242 IN.

2.11.3 Center Conductor: 18 AWG/Solid conductor.

2.11.4 Insulation: cellular polyethylene dielectric (double shielded).

2.11.5 Nominal attenuation at channel 6: 1.9 dB per 100 ft; at channel 13: 3.1 dB.

2.11.6 Shield of aluminum foil and drain wires or braid.

2.11.7 Each reel of cable sweep-tested and certified that attenuation of cable, over frequency range, does not deviate in excess of five percent in decibels from nominal attenuation value.

2.11.8 Outer jacket: low temperature non-contaminating material.

2.11.9 Mark with manufacturer's name (preferably Belden).

2.11.10 Cable shall be non-plenum rated. (Plenum rated may be used if required by Corps of Engineers or Base Civil Engineering).

## **2.12 INSTALLATION**

2.12.1 Install all cable in conduit or cable trays and perform all cable and equipment terminations. Install conduit cabling, pull boxes, and entry weather heads as required.

2.12.2 Do not install cable which show bruises or shipping damages.

2.12.3 Do not install any splices or connectors in conduit or inaccessible spaces.

2.12.4 Check each homerun cable thoroughly for opens, shorts, faults or other discontinuities.

2.12.5 Do not bundle amplifier input cables with output cables.

2.12.6 Do not suspend equipment by coaxial connection only.

2.12.7 Clearly and permanently label cables to show junction and destinations.

2.12.8 Fasten cables securely avoiding sharp bends and preventing rubbing against sharp corners.

### **2.13 ONE GUN PROJECTOR**

2.13.1 If one-gun projectors are required, it must be installed separate from any Falcon TV jacks or Falcon TV conduit. The following items must be provided to support the one-gun projector.

2.13.2 Ceiling mount for projector capable of holding 50-100 lbs, must be located near the center of the room, approximately 10 to 12 feet from the projection wall.

2.13.3 120AC outlet must be located in ceiling within 4 ft of projector mount.

2.13.4. 1 ½ inch conduit must be installed for each projector mount. This conduit should be run from a 2 gang box near the instructor multimedia equipment, up the wall to the ceiling mount, taking the most direct route possible and terminating in the ceiling with a bushing near the ceiling mount.

2.13.4 The cable to support the one gun project will be as follows

1 VGA computer cable: 7 conductor composite (see below graphic)

3 coax:

conductors - 28 AWG 7/36 TC

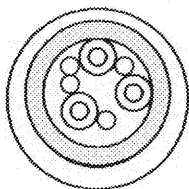
colors - Red/Green/Blue

impedance - 75 Ohms

4 conductors:

conductors - 24AWG 7/32 TC

Shield Aluminum/polyester and TC braid



1 RG-6 cable with BNC connectors

Audio stereo cable with RCA connectors

Computer audio cable with 1/8 inch stereo mini-connector

2.13.5 Wall box must be 2 gang box with faceplate containing the following connectors

1 - BNC bulkhead

2 - RCA jacks (female)

1 - 15 pin VGA (female)

1 - 1/8 inch mini stereo connector (female)

## **2.14 PERFORMANCE TESTING**

2.14.1 Conduct operating test.

2.14.2 Furnish all equipment and personnel required for test.

2.14.3 Using a field strength meter, measure signal levels at several random tapoffs in each feeder of system. Signal on each channel shall not read less than minimum signal levels as previously specified.

2.14.4 Measure signal-to-noise ratio.

2.14.5 Take measurements at output of last amplifier in system using field strength meter.

2.14.6 Difference between two readings (signal-to-noise ratio) shall not be less than 43 dB.

2.14.7 Connect standard color TV receiver to several random outlets and observe picture quality.

2.14.8 Ensure no visible components of snow, ghosting, beat interference, etc. appear on the screen.

## **3.0 PUBLIC ADDRESS SYSTEMS SPECIFICATIONS**

### **3.1 OVERVIEW**

This section provides procedures and specifications for installing public address systems and cabling for all facilities at the USAF Academy. All future building construction and renovations must meet these standards.

### **3.2 GENERAL REQUIREMENTS**

The work will be performed by a contractor with a Colorado Electrical License and the equipment will be furnished in accordance with the specific requirements and the general conditions of these specifications.

### **3.3 SCOPE**

3.3.1 The contractor will furnish all tools, labor, test equipment, hardware and materials needed to install all cable, speakers, and public address equipment .

3.3.2 All equipment will be installed in accordance with the factory recommendations and current sound system principles.

3.3.3 Upon completion of this work, the Contracting Officer's Representative (COR) will perform a Quality Assurance Inspection, to ensure the audio system meets the manufacturers standards outlined in the operations and maintenance manual and is in excellent operational condition.

### **3.4 INSTALLATION**

3.4.1 AutoCAD drawings will be submitted for approval by the COR prior to beginning the installation to include the following:

3.4.1.1 Front view layout of the equipment rack showing the proposed location of all equipment, conduit connection points to the equipment rack, and junction boxes above the equipment rack. All equipment shown in the equipment racks will be designated by generic description. The proposed layout of equipment will be based upon signal flow from right.

3.4.1.2 Proposed one line diagram of the sound system showing all components and wiring. Drawing will be revised as requested by the COR.

3.4.1.3 Proposed speaker locations and wire routing. Drawing will be revised as requested by the COR.

3.4.2 Termination of conduit and any 120 volts alternating current (VAC) circuits supplied to the rack as required.

3.4.3 Installation of new ceiling speakers tapped as required for a 70-volt system and volume controls.

3.4.4 Labeling of all wires in English with computerized printing, which describes the point of termination. Hand written labeling is unacceptable.

3.4.5 Confirmation of correct wiring of all 120 VAC circuits with dedicated isolated technical ground.

3.4.6 Test of technical ground to insure less than 10 ohms above earth ground.

3.4.7 Shortening of all power cords on the rack mounted equipment. Replacement of the 120 VAC plugs with Hubbell 5266C plugs.

3.4.8 Provide cable separation by different signal types (microphone, line, speaker and power) within the equipment cabinet rack and conduits.

3.4.9 Provide testing, adjustment, and balancing of the system.

- 3.4.10 Provide the COR with a complete listing of optimum equipment settings.
- 3.4.11 Plastic engraved labeling for all equipment. Knob and control settings will be marked with red or white nail polish.
- 3.4.12 Provide all connectors and miscellaneous parts to make the electronic equipment functional.
- 3.4.13 Provide all operations and maintenance manuals.
- 3.4.14 Provide all mounting hardware for electronic equipment.

### **3.5 MATERIALS**

#### **3.5.1 Manufacturers**

##### **3.5.1.1 Acceptable public address equipment manufacturers:**

3.5.1.1.1 Mixers: Altec Lansing, Yamaha.

3.5.1.1.2 Amplifiers: Altec Lansing.

3.5.1.1.3 Tape Decks/CD Players: Denon, Yamaha.

3.5.1.1.4 Equalizers: Altec Lansing.

3.5.1.1.5 Limiters: dBx, Altec Lansing.

3.5.1.2 Manufacturer must have established reputation of device for five years with satisfactory service.

3.5.1.3 Manufacturer must have local service and warranty station.

### **3.6 CABLE SPECIFICATIONS**

3.6.1 Microphone and line cable will be Stranded 2C/22AWG shielded.

3.6.2 Speaker cable will be Stranded 2C/18AWG unshielded.

### **3.7 SPEAKERS**

3.7.1 Ceiling speakers will be two-way, full range, 8" duplex speakers with a frequency range from 85 Hz - 18 kHz. The speakers will have a pressure sensitivity of 97-dB spl and have 70.7 volt input transformer with multi-tapped output. (Example: Altec Lansing 409-ST 4-Watt).

3.7.2 Contact 10th Communications Squadron COR for speaker tapping instructions.

### **3.8 TESTING**

3.8.1 The following tests will be performed by the contractor:

#### **3.8.1.1 Transducer Line Impedance**

Measure the impedance of each line exiting the equipment rack with the line disconnected from its normal driving source. Confirm impedance values within +10% of the value calculated for the circuit based upon the parallel impedance values plus the resistance of the cable. Record the impedance at 1000 Hz for full range devices. Verify the minimum load impedance is not exceeded and there are no shorts to the conduit or ground.

#### **3.8.1.2 Parasitic Oscillation and Radio Frequency Pick Up**

Using a hand held radio provided by the COR, check to ensure the system is free from spurious oscillations and radio frequency interference when driven to full output potential at 1000 Hz.

#### **3.8.1.3 Polarity**

Phase all lines identically with respect to color-coding. Visually inspect all transformer primary and secondary wiring to insure proper phasing.

#### **3.8.1.4 Freedom from Buzzes, Rattles, and Objectionable Distortion**

Apply a slow sine wave sweep from 100 to 10,000 Hz at a level 6 dB below rated power input levels. Listen carefully for buzzes, rattles, and objectionable distortion at speaker locations. Correct all causes of these defects.

#### **3.8.1.5 Gain Control Setting**

Establish tentative "normal" settings for all gain controls. All gain controls will be adjusted for optimum signal-to-noise ratio and signal balance. Mark all knobs and control settings with a red or white nail polish dot.

## **4.0 LAND MOBILE RADIO SYSTEMS SPECIFICATIONS**

### **4.1 OVERVIEW**

This section provides procedures and specifications for installing Land Mobile Radio (LMR) systems inside facilities at the USAF Academy. All future building construction and renovations that include LMR requirements must meet these standards.



## **4.2 REFERENCES**

Motorola R56 Standards.

## **4.3 COORDINATION**

As each LMR installations within a building varies greatly, all LMR requirements must be coordinated through the Personal Wireless Communications office and Frequency Manager (10 CS/SCMP).

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# **ATTACHMENT NO. 6**

## **PAVEMENT CALCULATION SHEETS**

## RIGID PAVEMENT DESIGN

(Non-Reinforced)

(The use of this form does not preclude compliance with all requirements of AFM 88-7, Chap. 1 and AFM 88-7, Chap. 5)

### 1. STRENGTH DESIGN.

1.1. Class = \_\_\_\_ (Table 1 or 2 in AFM 88-7, Chap. 5)

1.2. Category = \_\_\_\_ (Chapter 3 of AFM 88-7, Chap. 1)

1.3. Design Index = \_\_\_\_ (Table 3-1 of AFM 88-7, Chap. 1)

1.4. Modulus of Soil Reaction (Subgrade)= k = \_\_\_\_ pci (If test results are not available, refer to Table 9-1 of AFM 88-7, Chap. 1, for typical values).

1.5. Concrete 28-day flexural strength = \_\_\_\_ psi (650 psi)

1.6. If a base course is not required under rigid pavement, pavement thickness shall be determined using the subgrade modulus of soil reaction, k.

Pavement Thickness = \_\_\_\_ inches (Figures 12-1 and 12-2 of AFM 88-7, Chap. 1)

1.7. If a base course is required under rigid pavement; pavement thickness shall be determined using the following interactive process whereby the total base course thicknesses are assumed and the effective modulus of soil reaction on top of the base is determined. Effective K values are used to determine the required pavement thickness.

<u>Trial</u> <u>Number</u>	<u>Assumed Base</u> <u>Course Thickness</u>	<u>Effective</u> <u>Soil Reaction</u> <u>(Fig. 9-1 of</u> <u>AFM 88-7, Chap. 1)</u>	<u>(**) Pavement</u> <u>Thickness</u> <u>(Fig. 12-1 or</u> <u>Fig. 12-2 of</u> <u>AFM 88-7, Chap. 1</u>
1			
2			
3			
4			

(\*\*) Effective Soil Reaction from Fig. 9-1 of AFM 88-7, Chap. 1, will be used for the K value in Figure 12-1 or 12-2.

**RIGID PAVEMENT DESIGN**  
(Non-Reinforced)

Pavement Thickness = \_\_\_\_ inches

Total Base Course Thickness = \_\_\_\_ inches \*

\* Note: The minimum base course thickness is 4 inches.

1.8 Compacted Subgrade Thickness = \_\_\_\_ inches (Chapter 9 of AFM 88-7, Chap. 1)

**2. FROST DESIGN.**

2.1. Reduced Subgrade Strength Method. (Exception from the full thickness requirements of the limited subgrade penetration design method is not permitted where subgrade soils are group F4 under adverse moisture conditions.)

2.1.1. Design Index = \_\_\_\_ (from paragraph 1.3. above)

2.1.2. Concrete 28-day flexural strength = \_\_\_\_ psi (from paragraph 1.5. above)

2.1.3. Soil Group = \_\_\_\_ (From Soils Report or Table 18-2 of AFM 88-7, Chap. 1)

2.1.4. The following is an interactive process whereby the total base course thicknesses are assumed and frost-area indices of reaction are determined. These values are used to determine the required pavement thickness. In no case should the frost-area index of reaction exceed the value of K in paragraph 1.4. used for the strength design.

<u>Trial</u> <u>Number</u>	<u>Assumed Base</u> <u>Course Thickness</u>	<u>Frost-area Index</u> <u>of Reaction</u> (Fig. 18-5 of AFM 88-7, Chap. 1)	(**) <u>Pavement</u> <u>Thickness</u> (Fig. 12-1 or Fig. 12-2 of AFM 88-7, Chap. 1)
-------------------------------	--	--	---

1  
2  
3  
4

(\*\*) Frost-area Index of Reaction from Fig. 18-5 of AFM 88-7, Chap. 1, will be used for the K value in Figure 12-1 or 12-2.

Pavement thickness = \_\_\_\_ inches.

Total Base Course Thickness = \_\_\_\_ inches.

**RIGID PAVEMENT DESIGN**  
(Non-Reinforced)

Note: The values above should represent the least expensive combination of base course and pavement thicknesses shown in the Table in paragraph 2.1.4. above. The combined thickness of all base courses shall be at least equal to the slab thickness, except as outlined in paragraph 18-7 (b) of AFM 88-7, Chap. 1. The minimum base course thickness is 4 inches.

2.1.5 Depth of Subgrade Preparation = \_\_\_\_ inches  
(Para 18-17 of AFM 88-7, Chap. 1).

If existing subgrade soils are relatively homogeneous with uniform frost susceptibility or the exceptions in paragraph 18-17a of AFM 88-7, Chap. 1 are applicable, the subgrade requirements in paragraph 18-17 of AFM 88-7, Chap. 1 shall not be required. The compacted subgrade thickness shall be in accordance with Chapter 9 of AFM 88-7, Chap. 1.

3. **FINAL PAVEMENT SECTION.** The Strength Design method shall be used to determine the final pavement design in areas with non-frost-susceptible subgrade soils and in areas where frost will not penetrate into the subgrade. For all other areas, the final pavement design shall be determined using the greater pavement thickness obtained by either the Strength Design method or the Frost Design method.

Concrete Pavement thickness = \_\_\_\_ inches. (6" min.)

Rigid Base Course Thickness = \_\_\_\_ inches. (4" min.)

Compacted Subgrade Thickness = \_\_\_\_ inches.

## **FLEXIBLE PAVEMENT DESIGN**

(The use of this form does not preclude compliance with all requirements of AFM 88-7, Chap. 1 and AFM 88-7, Chap. 5).

### **1. STRENGTH DESIGN.**

1.1. Class = \_\_\_\_ (Table 1 or 2 in AFM 88-7, Chap. 5)

1.2. Category = \_\_\_\_ (Chapter 3 of AFM 88-7, Chap. 1)

1.3. Design Index = \_\_\_\_ (Table 3-1 of AFM 88-7, Chap. 1)

1.4. CBR (compacted subgrade) = \_\_\_\_ (If test results are not available, refer to Page 8-3 of AFM 88-7, Chap. 1, for typical values)

1.5. Design Thickness = \_\_\_\_ inches (Figure 8-1 of AFM 88-7, Chap. 1)

1.6. Compacted Subgrade Thickness = \_\_\_\_ inches (Table 4-1 of AFM 88-7, Chap. 1)

### **2. FROST DESIGN.**

2.1. Reduced Subgrade Strength Method. (Exception from the full thickness requirements of the limited subgrade frost penetration design method is not permitted where subgrade soils are group F4 under adverse moisture conditions.)

2.1.1. Design Index = \_\_\_\_ (From paragraph 1.3. above)

2.1.2. Soil Group = \_\_\_\_ (From Soils Report or Table 18-2 of AFM 88-7, Chap. 1)

2.1.3. Soil Support Index = \_\_\_\_ (Table 18-3 of AFM 88-7, Chap. 1)

2.1.4. Design Thickness (\*\*) = \_\_\_\_ inches (Figure 8-1 of AFM 88-7, Chap. 1)

(\*\*) Soil Support Index from Table 18-3 of AFM 88-7, Chap. 1, will be used for the CBR value in figure 8-1.

### **FLEXIBLE PAVEMENT DESIGN**

2.1.5 Depth of Subgrade Preparation = \_\_\_\_ inches (Para 18-17 of AFM 88-7, Chap. 1).

If existing subgrade soils are relatively homogeneous with uniform frost susceptibility or the exceptions in paragraph 18-17a of AFM 88-7, Chap. 1 are applicable, the subgrade requirements in paragraph 18-17 of AFM 88-7, Chap. 1 shall not be required. The compacted subgrade thickness shall be in accordance with Chapter 4 of AFM 88-7, Chap. 1.

3. **FINAL PAVEMENT SECTION.** The Strength Design method shall be used to determine the final pavement design in areas with non-frost-susceptible subgrade soils and in areas where frost will not penetrate into the subgrade. For all other areas, the final pavement design shall be determined using the greater pavement thickness obtained by either the Strength Design method or the Frost Design method.

Bituminous Surface Course thickness = \_\_\_\_ inches. (2" min.)  
Bituminous Tack Coat  
Bituminous Intermediate Course = \_\_\_\_ inches. (2" min.)  
Bituminous Prime Coat  
Aggregate Base Course Thickness = \_\_\_\_ inches. (4" min.)  
Subbase Course Thickness = \_\_\_\_ inches. (4" min.)  
Compacted Subgrade Thickness = \_\_\_\_ inches.



# **ATTACHMENT NO. 7**

## **METRIC DESIGN GUIDE (MDG)**

Note: The first three pages of this attachment list criteria that has superceded specific criteria listed in the MDG. Where applicable, use the new criteria found on these first three pages.

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c. The metrication process for products involves "soft metric conversion" and "hard metric conversion". Dimensions for the vast majority of construction products need only be "soft-converted" for use in metric construction projects. A soft metric conversion means that the physical dimensions of the product remain unchanged while the measurement units used to describe and specify the product are changed to metric units. To make metric construction succeed, a small percentage of products need their physical dimensions changed or "hard-converted" to fit them into the internationally recognized building module of 100 millimeters (mm). These products are frequently referred to as modular products or hard metric products.

Modular construction products are brick, CMU (also known as concrete block) components of the suspended ceiling systems such as acoustical ceiling tiles, recessed lighting fixtures (RLF) and air diffusers, raised access flooring, wallboard, plywood, particleboard, and rigid insulation. According to the guidelines in reference 1.a., a modular construction product in a hard metric size shall only be specified in a Federal construction project if the product's application requires it to "dimensionally coordinate" into 100 mm building module, the product is found to be competitively available, and the product's total installed cost is reasonable. Total installed cost is the cost of purchasing and installing the product including all cutting/trimming necessary to fit them with other building components in a 100 mm building module. Use of modular products avoids unnecessary jobsite cutting or trimming fostering cost-effective, logical design and quality construction.

#### **4. GUIDELINES FOR SOME SPECIFIC MODULAR CONSTRUCTION PRODUCTS.**

a. **Steel Reinforcing Bar.** The actual diameter size of steel reinforcing bar is not required to change in order to coordinate dimensionally into the 100 mm building module. Therefore, the American Society for Testing and Materials (ASTM) has recently adopted new metric bar standards which are based on soft conversion of existing inch-pound bars.

b. **Brick.** Many common brick sizes are within a millimeter or two of metric modular sizes and nearly all can fit within 100 mm module by slightly varying mortar joint widths to 10 mm.

c. **Concrete Masonry Units (CMU).** The new legislation which becomes effective 10 January 1997 (reference 1b) allows federal agencies to specify only hard metric versions of CMU unless (1) the block will be required to fit together into the 100 mm building module, and (2) the "agency head" determined (prior to contract award)

that the total installed price of hard-metric CMU is estimated to be equal to or less than the total installed price of using inch-pound (soft metric) CMU. To comply with the new law, the majority of the Federal agencies including USACE, elected to let the construction contractor use either metric or substitute inch-pound blocks in our metric projects without compromising design requirements. Construction documents for bids or proposals, issued after 10 Jan 97, will incorporate this policy. It is the general contractor, not the government, who will make the decision whether metric or inch-pound concrete block offers the most efficient and cost-effective solution in each situation. If the general contractor decides to use inch-pound CMU, the following provisions should be met so that quality is not jeopardized: (1) mortar joint width should be no less than 10 mm, (2) horizontal reinforcements, if required, should be placed between the joints only, (3) no cut block should be put at the end of wall, and (4) if the vertical reinforcement and the masonry block webs do not match, the block must be cut to adjust, rebars will not be cut, bent or eliminated to correct the condition.

**d. Suspended Ceiling Systems.** Components for suspended ceiling systems are T-bars, hangers, ceiling tile, recessed lighting fixtures (RLF), and recessed air diffusers. All components are available in modular metric sizes and are priced competitively with their inch-pound counterparts with the exception of recessed lighting fixtures. In this case also, for compliance with the above mentioned law, USACE and other Federal agencies elected to let the construction contractor make the decision whether metric or inch-pound recessed lighting fixtures should be used. Construction documents for bids or proposals, issued after 10 January 1997, will incorporate this policy. If the general contractor decides to use inch-pound RLF, he will be allowed to use substitute inch-pound products for all suspended ceiling components provided they do not interfere with other design requirements.

**e. Raised Access Flooring.** Raised access flooring is a specialty item used primarily in computer rooms and other areas where provision for under floor cabling is desirable. A number of manufacturers make raised access flooring to fit the 100 mm module, but there may be a cost premium for small orders and longer delivery times for most orders. Metric raised access flooring will be specified if costs are comparable to inch-pound access flooring and procurement lead times are acceptable.

**f. Wallboard.** Wallboard is formed in continuous sheets of variable widths and cut to specified lengths. A variety of manufacturers make wallboard to fit the 100 mm module, but there may also be a cost premium for small orders and longer delivery times for most orders. While the use of metric wallboard is desirable in metric projects, its use is not mandatory on small projects or small orders if project duration or cost will

increase. Where framing spacing is specified to fit modular metric construction, the contractor should not be allowed to cut or trim the sealed edges of inch-pound (soft metric) wallboard sheets to fit into the metric frame spacing.

**g. Plywood and Particleboard.** Like wallboard, wood-based sheet products such as plywood and particleboard can be produced in modular metric sizes. There may be a premium for small orders and longer delivery times for most orders. When framing spacing is specified to fit modular metric construction, the construction contractor may make the decision whether metric sheets or trimmed inch-pound sheets offer the most efficient and cost-effective solution in each situation.

**h. Rigid Insulation.** Rigid insulation is used on exterior walls and as a roof underlay. Currently, this product is available only in inch-pound sizes and must be cut to fit metric framing spacing. On roofs, the product is usually laid over a rigid substrate that allows any sheet size to be used. Where the sheets are applied directly to metric framing spacing (400 or 600 mm), the width must be trimmed by the contractor.

## 5. ADDITIONAL GUIDANCE AND INFORMATION ON METRICATION.

**a.** Further guidance on the federal acquisition of modular metric construction products is available from the Construction Metrification Council of the National Institute of Building Sciences, 1201 L Street, N.W., Suite 400, Washington D.C. 20005, Tel. 202-289-7800. The Construction Metrification Council issues a bimonthly newsletter, *Metric in Construction* which provides private and public support for the metrification of Federal construction and promotes the adoption and use of the metric system of measurement.

**b.** HQUSACE Architectural *Gargoyle* is an informal publication that is issued by CEMP-A. This publication provides information and news of interest about metrification along with other hot topics. *Gargoyle* can be found on CEMP-A web site at URL [http://www.hq.usace.army.mil/cemp/e/a/cemp\\_ea.htm](http://www.hq.usace.army.mil/cemp/e/a/cemp_ea.htm).

**c.** If you have any questions regarding metrification you should first contact your district metric point-of-contact (POC). If you do not know who your metric POC is, contact your district architectural POC. The list of architectural POC can be accessed from the CEMP-A web site. Quite often the district metric POC and the architectural POC are the same individual. The metric or architectural POC will be able to assist you in obtaining the answer.

**d.** Request for additional guidance or information concerning metrification should be

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# **METRIC DESIGN GUIDE**

## **(PBS-PQ260)**

**September 1995**

**Public Buildings Service  
U.S. General Services Administration**

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## **General Information**

### **Introduction**

Pub. L. 100-418 designated the metric system as the *preferred* system of weights and measures for U.S. trade and commerce. This law also directed all Federal procurement, grants, and other business-related activities to be metric by September 1992, unless this was impractical or likely to cause loss of markets to U.S. firms. Presidential Executive Order 12770, July 29, 1991, designated the Secretary of Commerce to direct and coordinate metric conversion efforts by all Federal departments and agencies, and authorized the development of specific dates for metric conversion in industries where September 1992 was impractical.

Executive Order 12770 also authorized the Secretary to create an Interagency Council on Metric Policy (ICMP) to assist the effort. The ICMP established 10 working subcommittees, each responsible for the conversion of Federal procurement in a major industry. The Construction Subcommittee was established to oversee metric conversion in the Federal construction industry.

In industries where a September 1992 conversion deadline was not feasible, the Executive order authorized a department or agency to consult the Secretary of Commerce to establish a more feasible date. The Construction Subcommittee evaluated the construction industry and proposed an alternate conversion date of January 1, 1994. This date allowed time to revise standards after some experience with pilot projects. The Subcommittee requested this time because, in the spirit of the law, it was going to propose using as many modular *hard*-dimension products as are made at any given time.

The General Services Administration (GSA) order, GSA Metric Program (ADM 8000.1B), dated November 11, 1992, required that all procurement be in the metric system of measurement by October 1992 or waivers be issued, supported by an assessment. This order established the alternative date of January 1, 1994, for construction.

Cooperation between Government and the private sector has been vigorously pursued as required by the Executive order. The Construction Subcommittee established a Construction Metrication Council in the National Institute of Building Sciences. The meetings of the Construction Metrication Council are attended by Federal agencies involved in construction, professional societies, trade organizations, product manufacturers, labor representatives, code organizations, and design firms. Attendance at the Council is extended to other parties interested in monitoring and assisting the metric conversion of the Federal construction community.

All GSA designs for renovation and new construction started after January 1, 1994, are being done in the metric system. Most Federal agencies involved in construction have already committed significant projects to be designed and built in metric.

Many private firms and governmental agencies involved with international construction have provided input and feedback to the material presented here. This document was coordinated with available private sector and professional society metric design guidance. Whenever possible, existing guidance has simply been adopted. Where private guidance did not exist, the most feasible direction has been developed and presented.

There are several "metric" systems in use in the world. The U.S. Government has adopted the International System of Units, abbreviated SI, from the French *Système international d'unités*. SI is used by major professional and code organizations.

An objective of the development of this document has been to minimize the impact on design firms, contractors, and product manufacturers, while still complying with the national directive of increasing U.S. competitiveness.

Due to the developmental nature of metric design in the United States, it is probable that this document will be updated occasionally to incorporate new metric design information and metric product manufacturers.

## **Benefits Of Metric**

### **International Acceptance**

U.S. industrial firms have sometimes been excluded from dealing in international markets because they are unable to deliver goods measured in metric terms. Others are increasingly unwilling to overcome this hurdle to utilize our products. U.S. firms in many cases then have to produce two sizes of a particular product.

U.S. firms will enjoy enhanced export potential by conducting business in the international language of measurement. Many companies have taken the initiative to understand foreign markets and become fluent in metric.

### **Simplicity**

Metric is decimal-based, and therefore simpler and faster to use. Trying to multiply 27 feet, 8-5/8 inches, by 32 feet, 6-7/16 inches, to obtain area demonstrates the complexity of our current system. English dimensions have to be converted to be added or multiplied, while metric ones do not.

The Canadian Construction Association reports that metric produced direct benefits, in terms of reductions in design costs and time, increased efficiencies in construction operations, and improved material and component dimensioning techniques, when commercial construction in Canada switched to the metric system years ago.

The U.S. Government in its own operations could expect the same advantages as stated in Pub. L. 100-418.

### **Product Variations**

Many organizations and some businesses have viewed metric conversion as an opportunity, and simultaneously selected fewer standard product sizes, reducing inventories and required manufacturing equipment. This opportunity exists with us as well.

### **One Unit For Each Property**

The metric system simplifies building engineering by using only one unit for each physical property. Examples:

**Pressure.** While the English system has pounds per square inch (psi), pounds per square foot (psf), tons per square foot (tons/SF), inches of water (inH<sub>2</sub>O), inches of mercury (inHg), and kips/SF, the SI metric system has only one pressure unit, the pascal (Pa). If more than 1 000 Pa are present, the kilopascal (kPa) is used. If more than 1 000 000 Pa, the Megapascal (MPa).

**Power.** The English system has watts (W), British thermal units (Btu's), horsepower (hp), tons, boiler hp, and other units. SI uses only W, kilowatts (kW), or milliwatts (mW), depending on the size of the number. An example of metric simplicity:

If an additional light fixture produces 600 W of heat, how many additional Btu's of cooling are needed to prevent a room temperature rise? Exactly how much will this add to system requirements? This must be calculated when using English units.

In SI, all thermal power units are measured in W.

The fixture produces 600 W, so the net system capacity must increase by 600W.

## **Standards**

See *Standard for Metric Practice* (ASTM E380), *SI Guide for HVAC & R* (ASHRAE), and *Handbook of Fundamentals* (ASHRAE) for accepted units and conversion tables.

## **Summary**

The American construction community is able to meet the metric conversion challenge in Federal construction, and it is in our long-term strategic interest to do so. There will be some initial effort involved, but close cooperation between the public and private sector will allow the goals to be successfully met.



## Metric Project Definition

A project is "metric" when:

- Specifications show SI units only.
- Drawings show SI units only.
- Construction takes place in SI units only.
- Inspection occurs in SI units only.

This does not imply that building products change. Over 95 percent of the products used in building construction today will undergo no physical change in metric construction. Dimensions of products will be identified in drawings, specifications, and product literature in metric units. These products will be spaced or cut in the factory or field to round metric dimensions

There are a few *products* that can be purchased in a slightly different size in order to be efficiently used in metric construction. This is generally called *hard* conversion. GSA will call all products round-numbered products whether they are manufactured in a different size or cut to size later. Spacing of materials such as stud spacing or floor-to-floor height or field-cutting materials to length should never be considered *hard* but merely round numbers. As international standards are developed, other products may be manufactured in round sizes to enhance their market potential.

## Dual Dimensions

Dual-dimensioning is a wasted effort. When English measurements are present, U.S. readers will use them and ignore the metric measurement. A project that is round in one measurement system will be unround in the other, and therefore more difficult to design and particularly build in the other system.

## Summary

It is important that drawings and specifications be metric exclusively. Most dimensions, particularly linear ones, should be round to avoid seriously impacting the largest cost component of a construction project, which is field labor.

## **Round Metric Dimensions**

Over 95 percent of currently used building products will not be sized differently in metric construction. Product literature and engineering data on these products should be requested with metric dimensions.

Product literature may contain both metric and English dimensions. Since product literature costs can be substantial, firms without metric product literature need only develop a supplement to their existing literature. Supplements will be accepted as submittals for an interim period.

In the future, as standard international metric product sizes are developed by the International Standards Organization (ISO) or another standards organization, more products may undergo modification to be compatible in the world market.

Listed below are examples of standard products that can be utilized on a metric project today.

### **Architectural**

- Carpeting.
- Door hardware.
- Elevators and escalators.
- Filing and shelving units.
- Kitchen equipment.
- Landscaping products.
- Lavatory units.
- Paint products.
- Resilient base.
- Revolving entrance doors.
- Roofing membranes.
- Systems furniture.
- Toilets.
- Toilet partitions.
- Vertical blinds.

## **Civil**

- Caisson forms.
- Reinforced concrete pipe.

## **Structural**

- Steel deck.
- Structural steel shapes.

## **Mechanical**

- Air handling units.
- Boilers.
- Chillers.
- Fan coil units.
- Pumps of any type.
- Heating, ventilating, and air-conditioning (HVAC) control systems.
- Pipe.
- Plumbing fixtures.
- Pumps.
- Valves.

## **Electrical**

- Cable trays.
- Conduit.
- Copper wire sizes (eventually metric sizes may be used).
- Fiber optic cables.
- Fire alarm systems and components.
- Junction boxes.
- Motors.
- Panelboards.
- Receptacles.
- Switches.
- Switchgear.
- Transformers.
- Underfloor duct systems.
- UPS systems.

## **Custom Products**

Custom products may be specified in any size. These products are made to fit a specific project in any measurement system and may therefore be specified in round metric sizes. Specific firms which are able to make these products are listed later in this document. Examples:

- Aluminum curtainwall systems.
- Wood doors.
- Glass.
- Interior stonework.
- Precast facade systems.
- Metal ductwork.
- Windows.

Not all dimensions of custom products will change. For example, while the length and width of curtainwall panels can be specified in round metric sizes, the cross-section of the extrusion does not need to change for construction. The dimensions of the cross-section can be a mathematical conversion or any number the industry decides to name the product. This also applies to window systems or ceiling grid systems where length and width or height are critical and the section dimensions are not.

## **Modular Products**

Modular products may be slightly different sizes in metric projects. The size of the product has been modified in order to be efficiently utilized in a metric project. A handful of currently used building products may undergo *hard* conversion to fit a round metric project.

Examples of products that may be physically changed:

- Suspended ceiling tiles and grids.
- Fluorescent lighting fixtures (lay-in type only).
- Air diffusers and grilles (lay-in type only).
- Brick and CMU (see *Architectural/Masonry* for contractor options).
- Drywall. (see *Architectural/General* section for contractor options).
- Raised access flooring.

## **Drawings**

SI drawings preferably use only millimeters (mm) to avoid fractions and to eliminate the repetitious suffix. The following note on drawings will avoid confusion: "ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED."

Decimal mm (such as: 2 034.5) are not required on SI drawings unless a high precision part or product thickness is being detailed. A whole number such as: 2 035 is adequate.

Dual dimensions should not be used.

Shop drawings or catalog data using the same dimensions as on contract documents will avoid errors in translation.

**Space Between Groups.** A space separating groups of three digits on drawing dimensions will allow faster and more accurate dimensional interpretation.

*Example:* A 20 meter dimension can be shown as 20 000.

**Scales.** American Institute of Architects (AIA) preferred metric scales, all multiples of 1, 2, or 5. See *Graphic Standards* for other scale information.

<u>Metric</u>	<u>Current</u>
1:2	1:2
1:5	3"-1'
1:10	-1/2"-1', 1"-1'
1:20	3/4"-1', 1/2"-1'
1:50	1/4"-1'
1:100	1/8"-1'
1:200	1/16"-1', 1"-20'
1:500	1/32"-1', 1"-40', 1"-50'
1:1 000	1"-80', 1"-100'

**Sheet Sizes.** While there are standard SI drawing sizes, any size may be used until new ones are issued through the usual supply process.

## **Specifications**

### **Millimeters (mm)**

SI specifications have used mm for almost all measurements, even large ones. Use of mm is consistent with dimensions in major codes, such as the National Building Code (Building Officials and Code Administrators International, Inc.) and the National Electric Code (National Fire Protection Association).

Use of mm leads to integers for all building dimensions and nearly all building product dimensions, so use of the decimal point is almost completely eliminated. Even if some large dimensions seem to have many digits there still will usually be fewer pencil or CAD strokes than conventional English Dimensioning

### **Meters (m)**

Meters have been used where large, round metric sizes are meant or where it is already customary, such as in surveying.

*Example:* "Contractor will be provided an area of 5 by 20 meters for storage of materials."

### **Centimeters (cm)**

Centimeters are typically not used in U.S. specifications. This is consistent with the recommendations of AIA and the American Society of Testing Materials (ASTM). Centimeters are not used in major codes.

Use of centimeters leads to extensive usage of decimal points and confusion to new readers. Whole millimeters are being used for specification measurements, unless extreme precision is being indicated. A credit card is about 1 mm thick.

*Example 1 - Mortar Joint Thickness.* If a 3/8-inch mortar joint between brick is needed, this would convert to 9.525 mm. Whole mm are used. Specify 10 mm joint thickness.

*Example 2 - Stainless Steel Thickness.* Bath accessories are commonly made from 22-gage (0.034-inch) thick stainless steel. Exact conversion is 0.8636 mm. This is

a precision measurement. However, since gage is a name and not a dimension, it is acceptable to use 22-gage on metric drawings and specifications until an industry converts sizes.

## **Rounding and Conversion**

**Simple Mathematical Rounding .** This leads to many problems. An example is to take an existing criteria dimension, such as 12 feet, convert it mathematically to 3 658 mm, and use this dimension. Builders, faced with entire drawing sets of awkward, nonrounded numbers, will find that metric is more difficult. In projects to date, a number of builders converted back to be able to measure with English tapes. They also made conversion mistakes, causing rebuilding and delay. It is very important to make job site labor more efficient by professionally rounding dimensions.

**Professional Rounding .** This technique takes the result of simple mathematical rounding, and applies professional judgment. The basic module of metric design is 100 mm.

Following are two examples of professional judgment in rounding design criteria that have already been included in GSA metric criteria in the *Facilities Standards for the Public Buildings Service (PBS-PQ100.1)*:

*Example 1: Conversion of a code requirement.*

*Step 1. Determine the nonoffending direction.*

1993 National Building Code Article 1011.3 requires 44 inches (1 118 mm) of unobstructed pedestrian corridor width. However, 1 118 mm is not a round number. It should be rounded to facilitate the cleanest construction possible. Narrower doesn't meet the code. The nonoffending direction is larger.

*Step 2. Select the largest feasible module.*

- 1 200 mm is feasible, so this represents a choice however GSA corridors are usually above code minimums. 1 500 may be more like current usage.
- Every effort should be made to keep design dimensions in increments of 100 mm.

In each case, the user must determine the acceptable choice, but the user is encouraged to present clean, rounded metric dimensions as alternatives. Simple mathematically converted dimensions will lead to an increase in project cost and time.

*Example 2:* Conversion of an existing design practice.

Professional rounding used when converting conventional design dimensions.

*Ceiling Height.* A common office ceiling height is 9 feet. Simple mathematical conversion yields 2 743 mm. This is an awkward dimension and can decrease productivity in use. Since this is above code requirements, there is no close minimum requirement.

*Step 1.* Determine the metric design tolerance.

If, instead of 9 feet, the installed height varies by a few inches, the visual and technical requirements will still be met and cannot be detected by casual observation. This variation in actual height becomes a "design tolerance." The selection of design tolerance is a professional judgment.

*Step 2.* Determine the acceptable design range.

A range is a simple mathematical conversion, such as 2 743, plus and minus 50 mm. Acceptable design range becomes 2 693 to 2 793.

*Step 3.* Select a preferred dimension.

2 700 and 2 800 are within an acceptable design range. 2 700 will cost less than 2 800 and is usually given first priority.

*Example:* Some roof flashing systems require fasteners at a minimum 24 inches on center, which mathematically converts to 609.6 mm. More fasteners would probably be acceptable at a slight increase in material cost. Selection of equivalent distance yields 600, which will be easier to install.



## **Architectural/General**

### **Module**

New GSA office building construction should use a 600 mm planning module. This is the closest to the common 24-inch module and products are made this size. See page 3-19 of the metric version of PBS-PQ100.1

### **Drywall**

Major drywall manufacturers currently offer round metric sizes in minimum order quantities. Only sheet length and width are classified in round metric. Standard sheet width is 1 200 mm. Lengths are available in 2 400 mm and several longer sizes. Thicknesses remain the same to minimize code impact. Standard thicknesses are 12.7 mm and 15.9 mm. Some architects are showing these as 13 and 16mm on drawings. Standard stud spacing is 400 mm, as it is the closest to 16 inches and is an even multiple of the sheet size. If drywall is installed horizontally across studs then the contractor could purchase drywall with the vertical dimension in a converted English size so only the length is round metric. This may widen the availability in smaller purchases.

Since a minimum order quantity can be significant, its use must be evaluated for each project. Currently this may be as high as a truckload, or about 700, of 1 200 by 2 400 sheets.) If minimum quantities will not be satisfied, then English-size drywall as shown above can be used and cut even though the project is metric, as is done in Canada. *These decisions can be left to the marketplace to determine by specifying stud spacing and drywall thickness but not length and width.*

### **Doors**

A common metric door size is 900 by 2 100 mm. This may be used on metric projects where other project specific design criteria are satisfied. Door thicknesses will remain the same, being identified by the nominal mm equivalent such as 45. A 950 by 2 150 door size is used in Canada as it matches metric block coursing.

### **Ceiling Systems**

Manufacturers make round-metric-size tiles and grids for use in metric projects. The most common sizes are 600 by 600, and 600 by 1 200 mm.

## **Architectural/Masonry**

Masonry walls have a critical wall thickness for fire resistance and compressive strength. They also are never relocated after construction. Beyond this, it is not important what dimension the height and width of a masonry unit is except for appearance, ability to accommodate metric window and door openings, having even coursing for ties and round dimensions between openings for ease of builder measurement, and weight of the unit for lifting. Project requirements then should be limited to these factors, with total competitive pricing determining the dimensioning. It should be noted that there are a number of proprietary, nonmortar joint, concrete block systems using English measurements, with builder labor advantages, that also require a local manufacturer to have different molds for concrete masonry units, as do metric units.

### **Brick**

The "metric modular brick" is the most common. Its size is 90 by 57 by 190mm (3-9/16 by 2-1/4 by 7-1/2 inches). American modular brick is:

- 3-5/8 by 2-1/4 by 7-5/8 inches (92 by 57 by 194 mm) when 3/8-inch joint is used.
- 3-1/2 by 2-3/16 by 7-1/2 inches (89 by 56 by 190 mm) when 1/2-inch joint is used.

The standard American modular brick used with a 1/2-inch joint is so close to the metric modular brick that it can be used with only a slight variation in joint thickness during field installation. Three vertical courses of metric modular brick with 10 mm joints equals 201 mm, which is rounded to 200.

Other sizes of metric brick are identified in *Graphic Standards*.

### **Block**

A standard American "8-inch" block is 194 by 194 by 397 mm for use with mortar joints. A nonmortar joint stacking block is usually 203 by 203 by 406 mm. GSA has used 190 by 190 by 390 mm metric blocks on some projects, which is the size that companies shown in the *Product Information* section responded to. The National Concrete Masonry Association may set a size standard in the future.

## **Architectural/Sheet Metal**

Most specification references use gage number followed by the decimal inch thickness.

*Example:* 22 gage (0.034 inch).

Use current standard sheet thicknesses. Show only the gage number on metric documents until a metric standard is developed.

*Example of usage:* Provide grab bar with a minimum wall thickness of 18 gage (0.051 inch). Replace with: Provide grab bar with minimum wall thickness of 18 gage.

## **Civil/Surveying**

The two primary Federal agencies involved in the production of survey information for public use are the National Geodetic Survey (NGS) and the U.S. Geological Survey (USGS). The databases for these two agencies are metric.

NGS, which maintains a database of hundreds of thousands of horizontal and vertical survey control points on which U.S. surveys are based, has been metric since 1983. USGS, which produces topographic maps of terrain elevations, has digitally mapped the U.S. surface. The ground distance between each pair of digitized points is 30 meters. Survey and mapping data necessary to do metric design and construction in the United States are available. Most states have adopted metric in their state plane coordinate systems.

The following information has been used on site plans and topographic maps.

Contour intervals utilize either 1.000, 0.500, or 0.250 m as contour intervals, depending on site slope.

Elevation measurements are given in m.

Benchmark elevations are converted from feet to m.

### *Examples:*

Benchmark is 314.15 feet. Convert to 95.753m.

Sample Contour Lines:

———— 106.0 ————  
———— 105.5 ————

## Civil/Concrete

Concrete strength is specified in MPa. The following strengths, which are used in Canada, may be used in metric construction. It is a good practice to use round numbers so that additional accuracy over English designations is not implied. The general purpose concrete strengths are reduced from six strengths to four strengths. Strengths above 35 MPa can be specified in 5 MPa intervals (40, 45, 50, 55, etc.). ACI 318 M, which is the metric version, is now used as a standard.

<i>Previous psi</i>	<i>Conversion MPa</i>	<i>Exact Specify MPa</i>	
2 500	17.23	20	
3 000		20.67	20 or 25 (See note)
below)			
3 500	24.12	25	
4 000	27.56	30	
4 500	31.01	35	
5 000	34.45	35	

*Note:* If code requires 3 000 psi, then 25 MPa must be used; otherwise, it is a professional judgment on 20 or 25.

## **Civil/Reinforcement**

Metric projects have used ASTM A615M reinforcing bars for general purpose applications. The M after A615 indicates a metric specification. A615M reinforcing bar comes in Grades 300 and 400, indicating 300 and 400 MPa yield strength.

There are 8 bar sizes, which replace the 11 English bar sizes. The Concrete Reinforcing Steel Institute (CRSI) is requesting that ASTM develop a new metric standard as the existing one uses bar numbers that are neither the bar diameter nor the overall diameter. The existing metric standard is merely different, it was never a true *hard* dimensioned product. Project managers are advised to check with the State Department of Transportation in their area to see what they are currently specifying as highways use proportionally more of this product than buildings.

While many firms can make metric rebar, and there are fewer sizes to evaluate and install, minimum order quantities apply. Canadians add M after each bar size to avoid confusion with larger English sizes.

<i>Nominal Diameter (mm)</i>	<i>Actual Diameter (mm)</i>	<i>Cross- Section Area (mm)</i>
10	11.3	100
15	16.0	200
20	19.5	300
25	25.2	500
30	29.9	700
35	35.7	1 000
45	43.7	1 500
55	56.4	2 500

Some applications may need A616M, A617M, A706M, or A775M.

## **Structural/General**

There are three world steel shape standards:

- ASTM A6/A6M (American).
- Japanese Industrial Standard (JIS).
- *Deutsches Institut fuer Normung (DIN)* (German).

A fourth is the BI, or British Imperial. None is dominant worldwide, but each is used extensively. There is no international standard issued by ISO, the official international group that develops worldwide standards.

An ISO standard is currently undergoing development, and will probably involve selection of shapes from the three primary world standards, coupled with elimination of redundant shapes.

## **Metric Projects**

Since no international trend exists on standardization of steel shapes, the American Institute of Steel Construction (AISC) recommends that metric projects use the same steel shapes currently used, but use the metric dimensions listed in ASTM A6/A6M. A6/A6M lists both inch and mm dimensions of shapes. All load and resistance factor design (LRFD) property, shape, and specification design data are available in metric from AISC for A6/A6M steel shapes. (Phone orders: AISC, Chicago, IL, 312-670-5414.)

Structural calculations done in metric are easier to review and have a lower probability of error.

## **Fasteners**

ASTM A325M and A490M are standards for structural metric bolts. There are seven standard metric bolt sizes, which replace the nine bolts currently used. Standard sizes are 16, 20, 22, 24, 27, 30, and 36 mm. Many manufactured products now use metric fasteners either in part or for all of a product. There are hundreds of firms making metric fasteners, screws, and bolts



## Structural/Floorload

Calculations are in kPa, but floorloading can be in kilograms (kg) per square meter because many dead and live loads are given in kg.

The following chart gives kPa strength ratings that can be used to replace the psf strength rating and not imply a greater accuracy:

<i>Previous (psf)</i>	<i>New (kPa)</i>	<i>Percent Stronger</i>
50	2.5	4.4
<b>80</b>	<b>4</b>	1.8*
100	5	4.4
120	6	4.4
150	7.5	4.4
200	10	4.4
250	12	0.2
300	15	4.4
350	17	1.4
400	20	4.4
450	22	2.1
500	24	0.2

\*GSA office floor standard, *PBS-PQ100.1*.

## **Mechanical/General**

### **Temperature**

Celsius is used for temperature designations in new or modernization building projects. Renovation projects where the entire mechanical system is not to be changed may retain Fahrenheit.

All major manufacturers of HVAC control systems offer products in Celsius.

### **Air Distribution**

Many manufacturers of diffusers and registers indicate they currently offer sizes to fit a round metric ceiling grid.

### **Ductwork**

Rectangular metal ductwork is a custom-made product. Typically, English-dimensioned ductwork is only shown to the nearest 2-inch increment. Round metric sizes are easier to measure (*example*: 300 by 600 mm) on a metric project. Prefabricated flexible round duct is specified in converted sizes.

**Units.** See the ASHRAE SI Guide.

## **Mechanical/Pipe**

Steel pipe and copper tube sizes will not now change. American sizes are used in many parts of the world and should be designated by nominal mm size. *Hard* metric pipe size may be used in the future. ASTM B88M, which gives standard hard metric copper tube sizes, will not be used until ample product availability can be established.

During transition to metric the following should be on at least the mechanical first sheet:

"ALL SIZES ARE INDUSTRY STANDARD ASTM A53 PIPE AND ASTM B88 TUBE DESIGNATED BY THEIR NOMINAL MILLIMETER (mm) DIAMETER EQUIVALENT. SEE CHART BELOW."

<i>Nominal Size</i>	
<i>Inch</i>	<i>mm</i>
1/2	15
3/4	20
1	25
1-1/4	32
1-1/2	40
2	50
2-1/2	65
3	80
3-1/2	90
4	100
5	125
6	150
8	200
10	250
12	300

## **Electrical/General**

Conduit will not now change size in metric. It will be classified by a nominal mm size. During transition to metric the following should be placed on at least the first electrical sheet. These are NEMA standards.

"ALL CONDUIT SIZES ARE INDUSTRY STANDARD ENGLISH SIZE CONDUIT DESIGNATED BY THEIR ROUNDED NOMINAL MILLIMETER (mm) DIAMETER EQUIVALENT. SEE CHART BELOW."

<i>Nominal Size</i>	
<i>Inch</i>	<i>mm</i>
1/2	16
3/4	21
1	27
1-1/4	35
1-1/2	41
2	53
2-1/2	63
3	78
3-1/2	91
4	103
5	129
6	155

## **Wire Size**

Use AWG or MCM until availability of wire manufactured to ASTM B682, standard metric conductor sizes, is determined. Round metric sizes per the above standard are substantially larger than round English sizes in secondary circuit use. Fiber optic cables are already metric.

## Lighting Fixtures

Round metric lay-in type fixture sizes are used when using a round-metric-sized ceiling grid. Many domestic manufacturers currently manufacture or can produce round metric sizes of 600 by 600 mm and 600 by 1 200 mm. The 600 by 600 mm size with sockets on one end is easier to manufacture in metric and may have more competition.

See PBS-PQ100.1 for GSA criteria for general ceiling lighting, including life-cycle cost requirements. Caution must be used to not take an older design and merely round off fixture dimensions or spacing because new energy requirements may substantially change a lighting layout from previous ones.

American manufacturers have produced metric fixtures either by modifying existing production machinery or they already had machinery that was specifically made for the metric market. To date, metric fixtures are being sold, in building quantities, at the same price as English sized fixtures.

Some manufacturers, even those who have competitively sold metric fixtures, claim that their costs are higher for metric production. Sources and costs of these products should be checked before requesting a project bid or proposal. Spare building fixtures for *Property Management* replacements beyond the *Initial Space Alteration* should also be considered to extend the time required before small purchases are needed.

## **Product Information**

This directory lists domestic manufacturers of commercial building products in one of the following classes:

- Manufacturers who make products that will not change size during metric conversion, but have developed product literature with metric dimensions in it.
- Manufacturers who currently manufacture or can manufacture round metric product sizes.

Each section will identify if the product being discussed is a converted odd dimension product or a round metric product size. All building products in this directory are made in the United States. Firms interested in being included in this directory may do so by contacting the Construction Metrication Council of the National Institute of Building Sciences, 1201 L Street, NW., Washington, DC 20005.

### **Air Diffusers and Grilles**

Lay-in air distribution grilles and diffusers use round metric sizes. Those that are wall mounted or ceiling mounted in drywall or cut in tile may use converted dimensions. Many companies making metric sizes simply modify their existing product.

*Example:*

- The actual width of a nominal 24- by 24-inch (610 by 610 mm) diffuser is usually about 23-3/4 inch (604 mm).
- To produce the same product for a nominal 600 by 600 grid, each edge must be slightly shorter, or about 590 mm (23-1/4 inch).

The following manufacturers can make round metric sizes for layin type applications.

- Acutherm, Emeryville, CA, a manufacturer of variable air volume air distribution devices, can manufacture its products in round metric sizes (Jim Kline, 510-428-1064).
- Aireguide, Hialeah, FL, a large manufacturer of air distribution products, can make 80 to 90 percent of its products in round metric sizes (Daryl Gray, 305-888-1631).

- Carnes, Verona, WI, one of the larger manufacturers of air distribution products, regularly makes round metric sizes (Dick Laughlin, 608-845-6411).
- Donco Air Products, Albion, IA, a small fixture manufacturer but a major manufacturer of light troffer diffusers, can manufacture light troffer, slot, and layin diffusers in round metric sizes up to 1 500 mm length (Ron Jansen/Marc Vandegrift, Engineering, 515488-2211).
- Duralast, New Orleans, LA, can make its primary diffuser product in a 600 by 600 mm variation (Ron Vinson (distributor), 504-837-2346).
- J & J Register, El Paso, TX, can make round metric sizes (Chris Smith, 915-852-9111).
- Juniper Industries, Middle Valley, NY, has previously made and can currently produce metric-size diffusers and grilles (Steve Liebermann, 718-326-2546).
- Krueger, Inc., Tucson, AZ, a large manufacturer of grilles and diffusers, has the capability to manufacture round metric sizes (Steve Bowser, 602-622-7601).
- Reliable Metal Products, Geneva, AL, a subsidiary of Hart & Cooley, is a medium-size manufacturer of air distribution products and can make about 90 percent of its products in round metric sizes (John Bowers, 205-684-3621).
- Rock Island Register, Rock Island, IL, can make its standard product, a 2- by 2-foot diffuser, in a 600 by 600 mm size (John Howarth, 309-788-5611).
- Sommerville Metalcraft, Cranfordsville, IL, can produce grilles and diffusers in round metric sizes (Paul Moehling, 800-654-3124).
- Thermo Kinetics, Greenville, SC, can make its standard grilles and diffusers in round metric sizes (Terry Rutledge, 803-277-8080).
- Titus Products, Richardson, TX, a major manufacturer of air distribution grilles and products, indicates a number of products currently available in round metric sizes (Dave Loren, 214-699-1030).

## **Carpet**

Although a few companies can make round-metric-size carpet tiles, this material may be procured by specifying other salient characteristics and allowing the competitive process to determine sizes, since all carpeting, tiles, and roll goods are cut at boundaries.

## **Curtainwall Systems**

Curtainwall systems are obtainable in round metric sizes. Length and width of the panels are available in any size. The other dimensions are typically in converted metric.

- Kalwell Corporation, Manchester, NH, is able to produce any size metric curtainwall system (Bruce Keller, 800-258-9777).
- Kawneer Company, Norcross, GA, has been supplying curtainwall systems in metric units to foreign markets and can handle any metric order (Enrique Morales/Edward Bugg, 703-433-2711).
- Profile Systems, Gerald, MO, subsidiary of the Maune Company, can produce in any size (Grant Maune, 800-962-8100).

## **Doors**

Domestic manufacturers produce hollow metal doors and wooden doors in any length and width desired. Round metric sizes can therefore be specified. Some firms producing round metric metal doors:

- Allied Steel Products, FL (Bill Desin, 305-624-3333).
- American Steel Products, Farmingdale, NY, can make any size metric door (Hank, 516-293-7100).
- Amweld Building Products, OH, has made and can make metric sizes (Mike Scott/Fred Bloom Jr., 216-527-4385).
- Ceco Door Division, Oak Brook, IL, a major manufacturer in the door industry, can make any round-metric-size door (Norb Bruzan, 312-242-2000).



- Duolock, Portland, OR, a division of Alumax, a major U.S. manufacturer of aluminum products, can make any size metric door (Clem Grant, 800-678-0566).
- SW Fleming, CA, MA, PA, SC (William Strong, 800-263-7515).
- Howard Industries, FL, has made and can make metric sizes (Bob Voigt/Joe Sixto, 305-888-1521).
- Republic Builders Products, TN (Jim Jackson, 901-352-3383).
- Steelcraft Manufacturing Company, OH, has been making metric sizes for export (Bill Ball/Claude Frederick, 513-745-6400).
- Tex Steel Corporation, TX (George Maldonado, 512-423-0912).

Firms producing round-metric-size wood doors:

- Eagle Plywood and Door Manufacturing, NJ (Tony Shiffano, 908-769-7650).
- Marlite, OH (Donald Sweitzer, 216-343-6621).
- Michigan Birch Door, MI, with a minimum of six doors (Roger Eger, 313-949-2020).
- Mohawk Flush Doors, PA (Don Enigk, 717-473-3557).
- Vancouver Door, WA (Gary Geppert, 206-845-9581).

## **Drywall**

The largest drywall manufacturers either actively sell metric-size drywall or have the capability to produce it. Standard metric drywall width is 1 200 mm. Lengths are available in any size. Thicknesses are 12.7 and 15.9 mm, which correspond to English sizes. Minimum order quantities apply, but are typically about a truckload, or 700 sheets.

- Celotex, FL (George Mitchel, 813-873-4027).
- Centex American Gypsum (Lex Dominey, 800-545-6302).
- Domtar Gypsum, MI (Jim Hanser/George Shortreed, 313-930-4700).

- Georgia Pacific, GA (Bronwyn Dawkins, 404-521-4000).
- James Hardie Gypsum, NV (Todd Thomas, 310-787-6950/Alex Beaman, 800995-0950 x210).
- Temple Inland (Jim Rush, 800-231-6060).
- USG Interiors International, Chicago, IL (William Nelson, 312-606-5383/David Vanosdall, 312-606-3804).

### **Elevators**

All U.S. manufacturers can provide data and drawings in metric. Some product lines are produced in round metric dimensions

### **HVAC Controls**

All of the major manufacturers of HVAC controls currently offer products that will operate in Celsius. Some of those firms are:

- Johnson Controls.
- Barber Coleman.
- Robertshaw.
- Andover.
- Honeywell.

Contact your local representative for ordering information.

### **Lighting Fixtures**

When a round metric 600 by 600 or 600 by 1 200 ceiling grid is installed, round metric lay-in type fixture sizes must match. Many fixture manufacturers currently produce or can produce both modular metric sizes and still utilize currently used standard bulb sizes. When other than a lay-in type of lighting fixture is used in a project, then size is not critical and can be specified as an approximate size as in other equipment. The following companies produce both 600 by 600 and 600 by 1 200 fixtures unless otherwise noted.

- American Fluorescent, IL, supplies fixtures in orders of at least 500 fixtures (Gary Stabelfeldt, 708-249-5970).

- Bieber Lighting Corporation, CAS, supplies fixtures in orders of at least 50 fixtures (Bob Bieber, 800-243-2375/213-776-4744).
- C. W. Cole and Co., CA, supplies fixtures in orders of at least 20 fixtures (Frank Dayley/Jose Lopez, 818-443-2473).
- Day-O-Lite Manufacturing, RI, supplies fixtures with no minimum stated (Arthur Goldstein, 401-467-8232).
- Hasco Electric Corp., CT, supplies fixtures in orders of at least 20 (Anthony Vabaro, 203-531-9400).
- Holcor, IL, supplies fixtures in orders of 5 to 10 fixtures (Mark Nelson/Kathy Dykstra, 312-376-9780).
- Holophane, OH, supplies fixtures in orders of at least 100 fixtures (Bob Catone, 614-345-9631).
- Louisville Lamp, KY, supplies fixtures with no minimum stated (Mike Davidson, 502-964-4094).
- Lumispec, PA, supplies in orders of at least 30 fixtures (Eric Papougenis, 215-228-3830).
- Mark Lighting, NJ, supplies fixtures in orders of at least 50 fixtures (George Miller, 201-939-0880).
- Midwest Chandelier, KS, supplies in 600 by 1 200 size, in orders of at least 50 fixtures (Tom Lefkovitz/Doug Pasternak, 913-281-1100).
- Prudential Lighting, CA, supplies lensed fixtures only in orders of at least 75 fixtures (Tammy Swaim, 213-746-0360).
- Simkar Lighting, PA, supplies fixtures but has a premium on orders of less than 20 fixtures (Robert McCully, 215-831-7700).
- Solar Kinetics, TX, supplies fixtures with no stated minimum (Sandy McCrea, 214-556-2376).
- Thomas Industries Day-Bright, MS (Joe Kolarik, 601-842-7212).

- USI/Columbia Lighting, WA, supplies fixtures with no stated minimum, but is a large company (Mark Johnson/Fred Smith, 509-924-7000).
- Wellmade Metal Products, CA, supplies fixtures in orders of at least 100 (Bernie Shane, 510-562-1878).

## **Masonry**

Many companies can make metric brick and block sizes. Unless otherwise stated, there will generally be lead time and cost impact on this product.

- Adams Products, NC, can make metric block (several hundred block orders are acceptable) (Buddy Ray, 919-467-2218/Cheryl Gaw, 919-488-4120/Betty Hughes, 919-523-5136).
- Amcor Block, UT, can make metric block (Gayland Smith, 801-295-5470).
- Basalite, CA, can supply (Jim Mayer, 916-678-1901).
- Betco Block is supplying metric block to GSA (minimum order is 150 m<sup>3</sup>) (MD, Scott Harper, 301-654-2312/NY, Steve Nagel, 518-756-2125/VA, Robert Carmody, 703-591-2770).
- Buehner Block, UT, can supply metric block (Ron Hoffmann/Kent Mortensen, 801-467-5456).
- Burns and Russell, MD (Michelle McVey, 800-638-3188).
- Clarkes Block, GA, can supply (L.E. Wells, 912-234-3436).
- Colorado Concrete Manufacturing, CO, can supply metric block (Karl Dolder/Thor Kaumeyer, ( 303- 390-5477).
- Concrete Mold Components, CA, can supply molds (Maurice Alhadeff, 213-636-7534).
- Dagostino Building Blocks, NY (Ken Dagostino, 518-374-3116).
- Elco, PA, can produce metric block. Several hundred block orders acceptable (William Albright, 717-274-3661).

- Featherlight Building Products, TX, can produce metric block (Wade Albritton/H.V. Moss, 512-472-2424).
- Gorla Enterprises, NC, can make metric block (Ken Mayo, 919-375-5821).
- Grand Blanc Cement, MI, can supply metric block and metric molds, all shapes (Michael Hicks/Ron Hunt, 800-875-7500).
- Hagerstown Block, MD, can make metric block (301-733-3510).
- E.P. Henry, NJ, can supply hard metric block (Stephen Reale/Mariane Anzaldo, 609-845-6200).
- Adolph Jandris, MA (Tony Raila, 508-632-0089).
- Jewell Concrete Products, TX, can make metric block. Several hundred block orders are acceptable (Walter Grisham, 817-772-3440/Tom Call, 903-592-0752).
- Marquart Block, IA, can supply hard metric block (John Thiele/Scott Shimp, 319-233-8421).
- Miller Materials, MO, can make metric block (several hundred block orders are acceptable) (Charles Kreutzer, 816-444-2244).
- Mission Masonry, CO, supplied metric block to the GSA Denver facility (303-841-6089).
- Phoenix, Inc., MD (John Cissel/Don Bowers, 301-698-4010).
- Plasticrete, CT (Joe Rescigno, 800-243-6934).
- Proudfoot Corporation, CT, has made metric molds in the past, can supply metric sizes (Michael Thompson/James Loseth, 203-459-0031).
- Reading Rock, Inc., OH (Stan Bass, 513-874-2345).
- Sherman International, AL (Dannie Rodgers, 205-252-6900).
- Southern Brick & Block, VA (Ron Peters, 804-353-6681).

- Superlite Block, AZ. Several hundred block orders acceptable (John Graves, 602-352-3500).
- Trenwyth Industries, PA, makes many metric block sizes (Linda Adcock 800-233-1924).
- Tricon Enterprises, MA (Monica Maracaccio, 508-697-6112).
- Glen Gery Corporation, Wyomissing, PA, can make metric modular brick (Ron Hunsicker, Baltimore, 301-837-3170).
- Ochs Brick and Tile, Springfield, MN, can make metric modular brick (Rod Schutt, Plant Manager, 612-944-1450/Bob Larson, Sales Manager, 612-944-1450).
- U.S. Brick, Streetsville, Ontario, has 12 plants in the United States that can make metric modular brick (Ron Spencer, 416-821-8800 (Ontario)).

Since there are many U.S. brick and block manufacturers, check with your usual supplier to see if they can make the metric modular brick.

### **Plywood**

- Amer-Ply, NJ, can supply metric sheets. No minimum order quantity (Mr. Matthew, 908-352-8111).
- Boise-Cascade, ID, has made metric before, can supply metric (Jan Blechschmidt, 206-572-8300).
- Champion International, WA, makes metric sheet sizes and thicknesses. Metric available for underlayment, sheathing, and sanded products. Metric concrete form panels can be ordered. Minimum order is one truckload (Jim DiStefano, 206-572-8300 (form panels)/Steve Williams, 206-572-8300 (plywood, western)/Jim Clark, TN, 901-731-4550 (plywood, southern)).
- Furman Lumber, MA, can supply metric from their usual suppliers (Chris Hemingway, 508-670-3800/Offices: CT, FL, GA, MD, NJ, NY, PA, TX, VA).

- Multnomah, OR, can supply 50 - 100 piece orders (Paul Brooks/Anne Snyder, 503-297-4738).
- Murphy Plywood OR, can make metric plywood (John Murphy/Mark Gryziec, 503-459-3225).
- Oregon Strand Board, OR, can make metric engineering panels, similar to plywood, at no additional cost. Minimum order is one truckload (Joe Maliszewski, 503-466-5177).
- Potlatch, WA, has exported metric, can make metric sizes (C. D. Whitney/Mac Ryerse, 509-328-0930).
- Roseburg Forest Products, OR, makes 6 - 19 mm thick plywood, can make metric sheets. Makes other metric wood building products. Minimum order is one truckload (Dave Adams/Kevin Barry, 503-679-3311).
- Stone Forest Industries, OR, currently produces both metric dimensional and thickness plywood. This firm could produce about two pressloads (about 60 sheets) minimum order but premiums would apply to small orders of this size (Lain Osborn/Tom Clow, 800-541-6906).
- Vancouver Standard has made metric sizes, can make metric sizes. Generally makes AC and higher grade (Ken Trimbell/Bill Sparks, 800-367-0038).

### **Raised Access Flooring**

- C-TEC, Inc., Grand Rapids, MI, makes a 600 by 600 mm access flooring product line called the Metric Panel (Don Heeney, 616-243-2211).
- Interstitial Systems, Oakbrook, IL, currently manufactures a 600 by 600 mm raised floor system (Bill Collier, 708-691-8600).
- Tate Access Floors, Inc, Jessup, MD, currently produces a 600 by 600 mm access floor in light, medium, and heavy duty ratings. Generally, component unit prices are the same as English sizes (Lida Poole, 410-799-0123/Victor Sainato, 410-799-4200).
- USG Interiors/Donn, Chicago, IL, regularly makes metric access flooring in one of its four product lines (William E. Nelson 312-606-5358/David C. Vanosdall, 312-606-3804).

## **Reinforcing Steel**

- Atlantic Steel, GA (R.S. Mellum, 404-897-4505).
- Birmingham Steel, AL, produces metric bar in one plant and can produce it in IL, AL, and MS (Chuck James/Paul Corey, 800-677-1012; Robert Wilson/H.J. Hilton, 205-985-9290).
- Cascade Steel, OR (Glenn Peterson, 503-472-4181 x3307/Dennis Lauber).
- Florida Steel, FL, produces also in NC and TN; Don Ballard/Don Haney, 813-251-8811).
- New Jersey Steel, NJ, has made and can make metric bars (Gary Giovannetti/Elaine Skiba, 908-721-6600).
- North Star Steel, MN, has made and can make metric steel in both MN and IA (Michael Hanson, 612-688-1719/William Pepper, 612-731-5644).
- Nucor Steel, Plymouth, UT (R. Wayne Jones, 801-458-3961).
- Thomas Steel, IL, has and can make metric bar (Edward Koper/Jerry Wensel, 708-257-7701).

## **Steel Fabrication**

Many firms have the capability of fabricating steel from metric design drawings. Some of these firms are:

- Falcon Steel, Wilmington, DE (302-571-0890).
- Havens Steel, Kansas City, MO (816-231-5724).
- Interstate Iron Works, White Horse, NJ (Robert Aberson, 908-534-6644).
- Lehigh Structural Steel, Lancaster, SC (803-286-5656).
- Montague-Betts, Lynchburg, VA (804-522-3331).
- Steelco Division, Metropolitan Steel, Sinking Spring, PA (Ron Keating, 215-678-6411).



## Structural Bolts

Use metric bolt sizes in metric construction even though the steel sections are conversions. See *Structural/General* section. It is important in modern friction fittings in steel construction that bolts and holes use the same dimensioning system. Since the documents are metric, round metric avoids confusion. A benefit of using ASTM A615M sizes is that there is a reduction in the number of sizes of bolts, from nine to seven.

There are at least 20 firms that can make metric sizes. Minimum orders may be given in dollars (\$100), or by number (500) or by at least a keg. Where minimums exist they are in this range.

## Suspended Ceiling Systems

Suspended ceiling systems use round metric size in full scale metric construction. Many manufacturers currently make these metric sizes.

- Armstrong World Industries, PA, currently manufactures and sells round-metric-size ceiling products. Except for selected specialty items, the major portion of the Armstrong product line has already been or can be manufactured in round metric dimensions (Dan Kennard, 717-396-2684/Deb Kantner, 717-396 3045).
- Capaul Architectural Acoustics, Plainfield, IL, a medium-sized manufacturer, can produce and bid round-metric-size projects (Tom Stanton, Baltimore MD, 410-234-0010).
- Celotex Corporation, Tampa, FL, offers an entire product line of round metric sizes (George Mitchell, 813-873-4027).
- Chicago Metallic Corp., Chicago, IL, produces round-metric-size grids (Craig Trotier, 800-323-7164).
- National Rolling Mills, Malvern, PA, regularly makes round metric sizes (Rich Mattion, 215-644-6700).
- USG Interiors, Chicago, IL, regularly makes round-metric-size ceiling systems. Starting in 1994, this company will show all its round metric products and prices in its catalogue (William E. Nelson, 312-606-5358/David C. Vanosdall, 312-606-3804).

## **Systems Furniture**

Systems furniture manufacturers will not all convert to metric sizes immediately. Many companies export their English-dimensioned products to countries that construct buildings in metric. These products will need their dimensions identified in metric units in product literature for ease of layout. Listed below are some firms that have product literature with metric dimensions.

- GF Furniture Systems, Inc., Youngstown, OH, currently exports its English-size panels all over the world for use in metric construction. Product literature is available with metric dimensions (Don Detweiler, 216-533-7799).
- Herman Miller, Inc., Zeeland, MI, produces both English-size and round metric-size systems furniture. Standard round metric panels are 600, 800, 1 000, 1 200, and 1600 mm. Both the metric and the English sizes are sold outside the United States and utilized in metric construction. All Herman Miller production processes are in metric. Product literature is available with metric dimensions (Mark DeSchon, 616-772-3300).
- Steelcase, Grand Rapids, MI, currently exports its English-size products all over the world for use in metric construction. Product literature is available with metric dimensions (Ken Gilpin, 616-246-4990).

## **Tools**

- Lufkin Tools, NC, produces metric tape measures (919-362-7511).
- Stanley Tools, New Britain, CT, manufactures metric and metric/English tape measures (Carl Lickwar/Alan G. Martin, 203-225-5111).  
Model 32-158, Metric/English, 5 m/16 feet. Model 32156, Metric, 5 m.  
Model 33-428, Metric/English, 7.5 m/25 feet. Model 33443, Metric, 10 m.  
These can be ordered directly from Stanley or through your local hardware store.

## **Windows**

Commercial window systems are available in round metric sizes. They are typically made specifically for a project in a wide range in small increments of size, so that they can be round metric even if the manufacturer does not call them metric..

- Alenco Commercial Group, Bryan, TX, makes aluminum metric windows primarily for export, and can make any size for domestic use (Harold Chilton, 409-823-6557).
- Andersen Windows, Commercial Group, Bayport, MN, currently fabricates windows in its one domestic plant and exports to several countries (Craig Johnson, 612-439-5150).
- Caradco, IL, can make any size round metric window (Roy Szyhowski, 217-893-4444).
- Desco Company, DeSmet, SD, can produce round metric sizes (Cindy Albrecht, 605-854-9126).
- Marmet Corporation, Wausau, WI, can make any size metric window (Brent Schepp, 715-845-5242).
- Marvin Windows, Warroad, MN, has previously manufactured and can produce windows in metric sizes ( 218-386-1430).
- Optimum Windows, Bronx, NY, can produce round metric sizes (Candido Perez, 212-991-0700).
- Peerless Commercial Window Division, Kansas City, MO, can make any size round metric window (Tony Grossi, 913-432-2232).
- Pella Windows, Pella, IA, can make any size metric window (Cheryl Waits, 515-628-1000).

## **General Information**

### **Executive Order 12770 of July 25, 1991**

(Federal Register/Vol. 56, No. 145/ Monday, July 29, 1991 / Presidential Documents, pp. 35801-3)

#### **PRESIDENTIAL DOCUMENTS**

Executive Order 12770 of July 25, 1991

### **Metric Usage in Federal Government Programs**

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the Metric Conversion Act of 1975, Public Law 94-168 (15 U.S.C. 205a *et seq.*) ("the Metric Conversion Act"), as amended by section 5164 of the Omnibus Trade and Competitiveness Act of 1988, Public Law 100-418 ("the Trade and Competitiveness Act"), and in order to implement the congressional designation of the metric system of measurement as the preferred system of weights and measures for United States trade and commerce, it is hereby ordered as follows:

Section 1. Coordination by the Department of Commerce. (a) The Secretary of Commerce ("Secretary") is designated to direct and coordinate efforts by Federal departments and agencies to implement Government metric usage in accordance with section 3 of the Metric Conversion Act (15 U.S.C. 205b), as amended by section 5164(b) of the Trade and Competitiveness Act.

(b) In furtherance of his duties under this order, the Secretary is authorized:

(1) to charter an Interagency Council on Metric Policy ("ICMP"), which will assist the Secretary in coordinating Federal Government-wide implementation of this order. Conflicts and questions regarding implementation of this order shall be resolved by the ICMP. The Secretary may establish such subcommittees and subchairs within this Council as may be necessary to carry out the purposes of this order.

(2) to form such advisory committees representing other interests, including State and local governments and the business community, as may be necessary to achieve the maximum beneficial effects of this order; and

(3) to issue guidelines, to promulgate rules and regulations, and to take such actions as may be necessary to carry out the purposes of this order. Regulations promulgated by the Secretary shall function as policy guidelines for other agencies and departments.

(c) The Secretary shall report to the President annually regarding the progress made in implementing this order. The report shall include:

(1) an assessment of progress made by individual Federal agencies towards implementing the purposes underlying this order;

(2) an assessment of the effect that this order has had on achieving the national goal of establishing the metric system as the preferred system of weights and measures for United States trade and commerce; and

(3) on October 1, 1992, any recommendations which the Secretary may have for additional measures, including proposed legislation, needed to achieve the full economic benefits of metric usage.

*Sec. 2. Department of Agency Responsibilities.* All executive branch departments and agencies of the United States Government are directed to take all appropriate measures within their authority to carry out the provisions of this order. Consistent with this mission, the head of each executive department and agency shall:

(a) use, to the extent economically feasible by September 30, 1992, or by such other date or dates established by the department or agency in consultation with the Secretary of Commerce, the metric system of measurement in Federal Government procurement, grants, and other business-related activities. Other business-related activities include all use of measurement units in agency programs and functions related to trade, industry, and commerce.

(1) Metric usage shall not be required to the extent that such use is impractical or is likely to cause significant inefficiencies or loss of markets to United States firms.

(2) Heads of departments and agencies shall establish an effective process for a policy-level and program-level review of proposed exceptions to metric usage. Appropriate information about exceptions granted shall be included in the agency annual report along with recommendations for actions to enable future metric usage.

(b) seek out ways to increase understanding of the metric system of measurement through educational information and guidance and in Government publications. The transition to use of metric units in Government publications should be made as publications are revised on normal schedules or new publications are developed, or as metric publications are required in support of metric usage pursuant to paragraph (a) of this section.

(c) seek the appropriate aid, assistance, and cooperation of other affected parties, including other Federal, State, and local agencies and the private sector, in implementing this order. Appropriate use shall be made of governmental, trade, professional, and private sector metric coordinating groups to secure the maximum benefits of this order through proper communication among affected sectors.

(d) formulate metric transition plans for the department or agency which shall incorporate the requirements of the Metric Conversion Act and this order, and which shall be approved by the department or agency head and be in effect by November 30, 1991. Copies of approved plans shall be forwarded to the Secretary of Commerce. Such metric transition plans shall specify, among other things:

(1) the total scope of the metric transition task for that department or agency, including firm dates for all metric accomplishment milestones for the current and subsequent fiscal year;

(2) plans of the department or agency for specific initiatives to enhance cooperation with industry, especially small business, as it voluntarily converts to the metric system, and with all affected parties in undertaking the requirements of paragraph (a) of this section; and

(3) specific steps and associated schedules through which the department or agency will seek to increase understanding of the metric system through educational information and guidance, and in department or agency publications.

(e) designate a senior-level official as the Metric Executive for the department or agency to assist the head of each executive department or agency in implementing this order. The responsibilities of the Metric Executive shall include, but not be limited to:

(1) acting as the department's or agency's policy-level representative to the ICMP and as a liaison with other government agencies and private sector groups:

(2) management oversight of department or agency outreach and response to inquiries and questions from affected parties during the transition to metric system usage; and

(3) management oversight of preparation of the department's or agency's metric transition plans and progress reports, including the Annual Metric Report required by 15 U.S.C. 205j and OMB Circular A11.

(4) preparation by June 30, 1992, of an assessment of agency progress and problems, together with recommendations for steps to assure successful implementation of the Metric Conversion Act. The assessment and recommendations shall be approved by the head of the department or agency and provided to the Secretary by June 30, 1992, for inclusion in the Secretary's October 1, 1992, report on implementation of this order.

Sec. 3. *Application of Resources.* The head of each executive department and agency shall be responsible for implementing and applying the necessary resources to accomplish the goals set forth in the Metric Conversion Act and this order.

Sec. 4 *Judicial Review.* This order is intended only to improve the internal management of the executive branch and is not intended to create any right or benefit, substantive or procedural, enforceable at law by a party against the United States, its agencies, its officers, or any other person.

*<signature of President>*

THE WHITE HOUSE,  
July 25, 1991.

[FR Doc. 91-18028  
Filed 7-25-91; 3:06 pm]  
Billing code 3195-01-M

## **AGC Letter to Metrication Operating Committee**

### **THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA**

1957 E Street N.W. Washington, D.C. 20008 (202) 393-2040 FAX (202) 347-4004

MARVIN M. BLACK, President ROBINS H. JACKSON, Senior Vice President

BYRON L. FARRELL, Vice President LAWRENCE J. MCGOUGH, Treasurer

HUBERT BEATTY, Executive Vice President

Mr. Thomas R. Rutherford, P.E.  
Chairman, Construction Subcommittee  
Metrication Operating Committee  
5901 Leesburg Pike, Skyline 6, Suite 310  
Falls Church, VA 22041

Dear Tom:

Thank you for your fine presentations on "Federal Metrication Efforts" to the Federal Building Procedures and Project Delivery Systems Committees in Asheville, North Carolina. You will be pleased to know that both committees plus the Building Division Steering Committee strongly endorse your efforts, in fact, urge you to pick up the pace of metric conversion. The committee recommendations are consistent with AGC national policy which states unequivocally:

"Recognizing the inevitability of the nation eventually adopting the metric system, AGC endorses the consensus statement of the American Metric Council that, "If the industry is to go metric, a hard conversion is recommended where there is an economic advantage."<sup>21</sup> AGC supports an orderly conversion to the metric system at the earliest practical date."<sup>32</sup>

We look forward to working with you and the Metrication Operating Committee in achieving total conversion within your timetable. As you put it so succinctly, metric is the language of 93% of the world's population, only the U.S. remains in inch/pound. If we are to protect and develop global markets, we must speak the same language.

Sincerely,

*<signature of Director>*

William J. Angelo  
Director  
Building Division

Note: <sup>21</sup> Metric Conversion Committee Meeting Report, September 16, 1977

<sup>32</sup> Metric Committee Report to Board, March 17, 1981

cc: Robert F. Lathlaen  
J. Howard Mock  
Thomas J. McGough  
J. Doug Pruitt

## **Recommended Preparation**

### **Governmental Organizations**

- Provide this guide to staff and architectural/engineering (A/E) firms.
- Place CBD advertisements in metric format. See *A/E-CM CBD Guidance* section.

### **Private Design Firms**

- Contact product suppliers for metric product literature. If not available, request it be developed, even as a supplement to existing material. Research for competitive sources of materials specified must be performed just as it is for English-dimensioned documents.
- U.S. Government selection of design firms will increasingly emphasize firms with metric capabilities.
- Obtain important design documents: ASTM E380, ASTM E621, Graphic Standards (Eighth Edition), AISC LRFD Steel Data (Metric Version), ACI 318M Building Code (metric), and the ASHRAE SI metric version handbooks.

### **Product Manufacturers**

- Develop metric product literature. Most products in use today will not undergo any physical change during the metric transition. However, they will be specified only in metric dimensions on Federal projects.
- Metric product literature may be as simple as bond paper supplements, with metric dimensions, attached to existing material.
- Products identified herein as hard metric products have been researched and are competitively available today. Manufacturers of these products may wish to coordinate with trade groups to develop new standard metric sizes and use this as an opportunity to reduce product variations. Many other countries have done this as metric was implemented.



## **Metric Projects**

Some round metric products have minimum order quantities which may limit them to a project involving renovation of a floor or more of a building. Individual projects must be evaluated by managers for scope and size in planning them. Most products, however, are identical to the English-dimensioned products and can be used on any project. A modification of an entire building or a new building project has a large enough buying power and trade learning curve that all products in this guide may be used without extraordinary research.

Computer-aided drafting (CAD) has simplified execution of metric renovation projects, since drawings can be digitized in English dimensions and converted to metric scale. However, professional rounding must still be done after conversion. In major renovations, new round metric sizes can be installed, such as an entire new 600 by 600 mm ceiling system, even if the original module was different. Many historical buildings do not fit any module.

Do not control HVAC in one part of a building using Celsius temperature, while another part retains Fahrenheit. An entire building should be switched at once. A building temperature system can be converted to Celsius with no cost impact today, since modern digital HVAC control equipment has either degrees C or F as a software option.

## **Small Projects**

On some smaller size metric design and construction projects, contractors converted drawings and specifications done completely in metric dimensions back to English dimensions. In a few cases the contractor made mistakes in translation, one of them resulting in the wrong size steel columns being delivered to the job site. Contractors should be cautioned at the preconstruction meeting not to do this, as such errors are at their expense. Projects below \$1 - 2 million have been successfully completed in round metric, but they should be carefully reviewed so issues such as minimum order quantities do not have a large effect on time and cost.

## **A/E-CM CBD Guidance**

Commerce Business Daily (CBD) advertisements for A/E or construction management (CM) solicitations should use the following terminology.

- State the area of the project in square meters only.

*Example:* The new building will be approximately 15 000 occupiable square meters of office and storage space.

- Each announcement should state: "This project will be designed and built entirely in metric units."
- For A/E firm announcements, including term contract announcements, the following should be added as an evaluation factor: "Familiarity with metric system and ability to design in metric units."

*Note:* Do not yet mandate metric experience. While many firms have substantial metric experience, many excellent design firms have not yet had a metric design opportunity.

- For CM announcements, including term CM announcements, the following should be added as an evaluation factor: "Familiarity with metric system and ability to perform required services in metric units."

Each Request For Proposal (RFP) shall require a summary of the firm's metric experience, its experience with the metric system, and its ability to perform required services in metric units.

### **Construction CBD Guidance**

Use the following terminology for each CBD advertisement for construction projects designed in metric.

- Show the area of the project in metric dimensions only:

*Example:* "This project involves the renovation of a 24 000 gross square meter (GSM) building."

- State: "This project has been designed completely in metric units. All testing will use metric units. Shop drawings and product literature must be submitted with metric dimensions. Supplements to existing product literature will be accepted on bond paper."

### **A/E-CM Scope Guidance**

The following terminology is recommended for insertion into each A/E scope of work.

**Metric Measurement.** Measurements and units of any type, on all submissions of this project, shall be shown in SI metric units exclusively. English system measurements shall not

appear in reports, drawings, specifications, or any other submissions. A/E firms must strive to utilize as many round metric products as possible.

- All cost estimating should be submitted in metric units only.
- All correspondence should be written in SI units exclusively.
- Submit shop drawings, catalog cuts, and other construction phase material in metric units.
- Submit all operation and maintenance manuals in metric units.

### **Specification Guidance**

Based on metric project experience, terminology similar to the following three paragraphs should be included in Division One of the construction specification.

"During the prebid and/or preconstruction conference, a session will be specifically devoted to metric. GSA or its representatives will explain that most products specified are the same products contractors are currently using, only specified in metric dimensions. Modular metric products used on the project will be identified and discussed. Contractors will be cautioned that they should ask suppliers about delivery schedules on modular and round metric products, and not assume they are the same as English-dimensioned ones. Contractors should ensure that all workers are using metric tapes and not trying to convert to English at every measurement.

"All correspondence must use SI metric units exclusively. All cost data submitted by the contractor in a proposal or any other submission must be in metric units. All shop drawings, catalog cuts, and other submittals must be submitted with metric units and dimensions that clearly demonstrate conformance with the metric units given in the drawings and specifications. Metric supplements to existing product literature or data will be accepted on bond paper.

"All operations and maintenance (O&M) material must be submitted with metric units and dimensions that clearly demonstrate conformance with the metric units given in the drawings and specifications. Metric supplements to existing O&M material will be accepted on bond paper."

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## **ATTACHMENT NO. 8**

### **ENGINEERING TECHNICAL LETTERS**

The following Engineering Technical Letters are attached:

ETL 94-2 UTILITY METERS IN NEW AND  
RENOVATED FACILITIES

ETL 99-4 FIRE PROTECTION ENGINEERING  
CRITERIA AND TECHNICAL  
GUIDANCE – EMERGENCY LIGHTING AND  
MARKING OF EXITS

DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS AIR FORCE CIVIL ENGINEERING SUPPORT AGENCY

10 JUN 1994

FROM: HQ AFCEA/ENM  
139 Barnes Drive Suite 1  
Tyndall AFB FL 32403-5319

SUBJECT: Engineering Technical Letter (ETL) 94-2:  
Utility Meters in New and Renovated Facilities

1. Purpose. This ETL establishes a mandatory requirement for utility meters in new and renovated base facilities to measure consumption of supplied water, fuel, or energy. These meters measure energy and water used by general purpose (process) buildings, and utilities services reimbursable or refundable by the government or private business. Use of meters will:

- o Establish benchmarks of current energy consumption to help the Base
- o Energy Conservation Committee manage facility energy consumption;
- o Identify high energy and water consumers to help base personnel reduce consumption;
- o Enhance safety of fuel hydrant systems; and
- o Allow response to frequent Congressional inquiries regarding the effectiveness of energy and water analyses through metering.

2. Application.

2.1. Authority. The Code of Federal Regulations (10 CFR 435, Sect 10, Energy Management) and the Energy Policy Act of 1992 (Public Law 102-486, Sect 305), require metering of each distinct utility-provided energy service. This ETL also satisfies requirements of Office of the Secretary of Defense (OSD) Defense Energy Program Policy Memorandum (DEPPM) 92-2, Energy Conservation Investment Program Guidance, 4 March 1992, to validate energy savings.

2.2. Effective Date. This ETL supersedes ETL 87-5, Utility Meters in New and Renovated Facilities, 13 July 1987, and is effective immediately.

3. Specific Requirements. Install meters at all new facilities and each major renovation project. Install additional meters as required to satisfy local environmental monitoring laws. Provide a meter for each energy utility serving the building (steam, high-temperature hot water, electricity, natural gas, fuel oil). Meters will be calibrated in the normal units of the utility [MJ (kWh), L (cf or gal)]. If one form of energy is used to produce a second form (such as natural gas producing steam) used solely within that facility, meter only the primary source at the building boundary.

APPROVED FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

NOTE: These meters are for government use only for monitoring and evaluating energy consumption within a facility. They are NOT for utility company billing usage!

3.1. Electric Metering. Measure energy consumed by:

- o Electrical lighting;
- o Miscellaneous power outlets;
- o HVAC systems and equipment;
- o Service hot water; and
- o Process loads

for buildings where combined service exceeds 150 kVA or fuel use exceeds 146,536 W (500,000 Btu/h). Meter the following individually where system consumption exceeds 100 kVA or 87,921 W (300,000 Btu/h):

- o Production processes (manufacturing, computers, laundries, kitchens);
- o Auxiliary systems and service water heating;
- o Space heating (including reheat);
- o Space cooling; and
- o HVAC delivery systems.

Exception: When there is an energy service for only two of the six categories listed, take a single measurement for the larger service, and determine consumption of the smaller service by subtracting the larger service measurement from the primary service measurements.

3.2. Water Metering. Measure water consumption for:

- o All non-appropriated funded facilities which reimburse the government for water usage.
- o All facilities with a boiler plant 879.21 kW (3 MBtu/h) capacity or larger.
- o Facilities that use more than 18,927 liters (5000 gallons) of water per day, including landscape irrigation. These facilities should be addressed on a case-by-case basis and specified in the project definition when this requirement applies.

3.3. Types of Meters.

3.3.1. Watt-hour Meters.

3.3.1.1. Without Demand Registers. Watt-hour meters and sockets must comply with ANSI C12.10 and have pulse initiators for remote monitoring of watt-hour consumption. The pulse initiator will consist of Form C contacts with:

- o Current rating not to exceed 2 amperes (A);
- o Voltage not to exceed 500 volts (V);

- o Volt-amperes (VA) not to exceed 1 00 VA; and
- o Life rating of one billion operations.

3.3.1.2. With Demand Registers. Meters and sockets must comply with ANSI C12.10 and have pulse initiators for remote monitoring of watt-hour consumption and instantaneous demand. Pulse initiators will be as described in paragraph 3.3.1.1.

3.3.2. Water Meters. Meters must conform to American Water Works Association (AWWA) C700 and meet these criteria:

- o positive displacement, oscillating piston, or oscillating disc type;
- o magnetic drive with magnetic shielding;
- o straight reading sealed register graduated in liters (cubic feet);
- o all bronze split case;
- o integral strainer;
- o threaded ends;
- o with pulse switch initiator.

Water meters must be capable of accurately measuring and handling water at pressure, temperatures, and-flow rates encountered. The pulse initiator will provide the maximum number of pulses, up to 500 per minute, obtainable from the manufacturer; and not less than 1 pulse per 378.5 liters (100 gallons).

3.3.3. Gas Meters. Install meters according to 49 CFR 192, Transportation of Natural or Other Gas by Pipeline: Minimum Federal Safety Standards and the Guidance Manual for Operations of Small Gas Systems, U.S. Department of Transportation. Gas meters must conform to the American Gas Association (AGA) standard appropriate for the size and type meter installed. Meters must be capable of providing pulse or digital signals for remote readout. Pulse switch initiators will provide the maximum number of pulses, up to 500 per minute, obtainable from the manufacturer; and not less than 1 pulse per 2.83 cubic meters (100 cubic feet). Meters will have local readout capability and be calibrated in standard cubic meters (cubic feet).

3.3.4. Steam Condensate Meters. Meters must conform to MIL-M-1 8294, Style A or C, size 1. Meters will be designed for 121.1 degrees Celsius (250 degrees Fahrenheit) condensate, and flow rates from 7.6 to 37.8 liters (2 to 10 gallons) per minute. Meters will have a pulse switch initiator capable of 500 pulses per minute with no false pulses; and not less than 1 pulse per 37.8 liters. Meters will not require field adjustments.

3.3.5. Chilled Water Meters. If the facility receives chilled water from a central chilled water plant, install a watt ("Btu") meter. This is a commercially available meter which senses flow and temperature differential and automatically calculates and records watts. Meters must be capable of being read locally and by the base Energy Management and Control System (EMCS).



3.3.6. High-Temperature Water (HTW) Meters. If the facility is supplied HTW from a central plant, install a watt meter. This meter is similar to the chilled water meter, but suitable for the temperature and pressures incurred with HTW. Meters must be capable of being read locally and by the base EMCS.

3.3.7. Fuel Flow Meters. Refer to AFM 85-16, Maintenance of Petroleum Systems and NAVFAC DM 22, Petroleum Fuel Facilities.

3.3.8. Water and Wastewater Treatment Plant and Well Meters. Install meters for all plants and wells. Install flow-rate recording and totalizing meters in all plants treating more than 189,271 liters per day (0.05 MGD). Install totalizing meters in smaller plants. Components will meet these criteria:

- o Parshall flume - reinforced concrete with aluminum or reinforced fiberglass liner;
- o Nozzles - cast iron;
- o Weirs - brass alloy;
- o Magnetic - standard manufacturers product;
- o Control panel - standard manufacturers product (recording, indicating, and totalizing).

For wastewater treatment plant meters, refer to NAVFACENGCOM Guide Spec NFGS-13321, Flow Measuring Equipment (Potable Water) (Sewage Treatment Plant), 2 October 1985.

3.3.9. Heating Plant Meters- Provide the following instruments, meters, and auxiliaries:

3.3.9.1. Temperature Recorders: One for each high-temperature water boiler and each district heating circuit. Include meters on supply and return systems.

3.3.9.2. Recording and Integrating Flowmeters in Kilopascals (Pounds: One for each high-temperature water boiler and each district heating circuit.

3.3.9.3. Steam-Flow Meters: One recording and integrating type meter for each boiler using 87.9 kW (0.3 MBtu/h) or larger; or on a main header for a group of small boilers totaling 146.5 kW (0.5 MBtu/h) or more that allows recording pressure. Meters must be capable of being read locally and by the base EMCS. Turbine-type steam meters are not recommended. Refer to ANSI MFC-4M-86, Measurement of Gas Flow by Turbine Meters (R1990); MFC-5M-85, Measurement of Liquid Flow in Closed Conduits Using Transit-Time Ultrasonic Flowmeters; MFC-6M-87, Measurement of Fluid Flow in Pipes Using Vortex Flowmeters; MFC-11M-89, Measurement of Fluid Flow by Means of Coriolis Mass Flowmeters; and ASME PTC 19.5-72, Application Part II of Fluid Meters, sixth edition, 1971.

3.3.9.4. KWh (MBtu/h) Feedwater Meters: One for each high pressure boiler

plant 146.5 kW or larger not equipped with steam-flow meters.

3.3.9.5. CO<sub>2</sub>, O<sub>2</sub>, and Boiler Exit Temperature Recorders: One CO<sub>2</sub> or O<sub>2</sub> recording meter for each boiler 2931 to 13,188 kW (10 to 45 MBtu/h) output capacity. Provide boiler exit temperature on all boilers over 2931 kW.

3.3.10. Chilled Water Plant Meters. Install a temperature recorder at each plant. Provide flow recorders for constant and variable speed pumps, one for each chiller and each district chilled water circuit. Install meters on both supply and returns.

3.3.11. Make-Up Water Meters: One for each high-pressure steam and high-temperature water boiler plant.

3.3.12. Gas and Oil Meters: One for each boiler or direct-fired hot air furnace plant 879 kW (3 MBtu/h) or larger.

3.3.13. Temperature and Pressure Recorders: One for each feed water heater.

4. Definitions. New and renovated facilities include facilities which have not reached the 10 percent design stage as of the date of this letter. For this ETL, renovated facilities feature changes in the building envelope, replacement of lighting, HVAC, or water heating systems.

5. Point of Contact. Mr Freddie L. Beason, PE, HQ AFCESA/ENM, DSN 523-6361, commercial (904) 283-6361, FAX 523-6219.

DENNIS M FIRMAN, PE  
Director, Systems Engineering

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# ENGINEERING TECHNICAL LETTERS (ETL)

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82-2	Energy Efficient Equipment	10 Nov 82
83-1	Design of Control Systems for HVAC Change No. 1 ETL 83-1, U. S. Air Force Standardized Heating, Ventilating & Air Conditioning (HVAC) Control Systems	16 Feb 83
83-3	Interior Wiring Systems, AFM 88-15 Para 7-3	22 Jul 87
83-4	EMCS Data Transmission Media (DTM) Considerations	2 Mar 83
83-7	Plumbing, AFM 88-8, Chapter 4	3 Apr 83
83-8	Use of Air-to-Air Unitary Heat Pumps	30 Aug 83
83-9	Insulation	15 Sep 83
84-2	Computer Energy Analysis Change 1 Ref: HQ USAF/LEEEU Msg 031600Z MAY 84	14 Nov 83
84-7	MCP Energy Conservation Investment Program (ECIP)	27 Mar 84
84-10	Air Force Building Construction and the Use of Termiticides	1 Jun 84
86-2	Energy Management and Control Systems (EMCS)	13 Jun 84
86-4	Paints and Protective Coatings	1 Aug 84
86-5	Fuels Use Criteria for Air Force Construction	5 Feb 86
86-8	Aqueous Film Forming Foam Waste Discharge Retention and Disposal	12 May 86
86-9	Lodging Facility Design Guide	22 May 86
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86-14	Solar Applications	4 Jun 86
86-16	Direct Digital Control Heating Ventilation and Air Conditioning Systems	13 Jun 86
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88-4	Reliability & Maintainability (R&M) Design Checklist	21 Jan 88
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88-10	Prewired Workstations Guide Specification	1 Aug 88
		7 Oct 88
		29 Dec 88

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89-3	Facility Fire Protection Criteria for Electronic Equipment Installations	9 Jun 89
89-4	Systems Furniture Guide Specification	6 Jul 89
89-6	Power Conditioning and Continuation Interfacing Equipment (PCCIE) in the Military Construction Program (MCP)	7 Sep 89
89-7	Design of Air Force Courtrooms	29 Sep 89
90-1	Built-Up Roof (BUR) Repair/Replacement Guide Specification	23 Jan 90
90-2	General Policy for Prewired Workstations and Systems Furniture	26 Jan 90
90-3	TEMPEST Protection for Facilities Change 1 Ref: HQ USAF/LEEDE Ltr dated 20 April 90, Same Subject	23 Mar 90
90-4	1990 Energy Prices and Discount Factors for Life-Cycle Cost Analysis	24 May 90
90-5	Fuel and Lube Oil Bulk Storage Capacity for Emergency Generators	26 Jul 90
90-6	Electrical System Grounding, Static Grounding and Lightning Protection	3 Oct 90
90-7	Air Force Interior Design Policy	12 Oct 90
90-8	Guide Specifications for Ethylene Propylene Diene Monomer (EPDM) Roofing	17 Oct 90
90-9	Fire Protection Engineering Criteria for Aircraft Maintenance, Servicing, and Storage Facilities	2 Nov 90
90-10	Commissioning of Heating, Ventilating, and Air Conditioning (HVAC) Systems Guide Specification	17 Oct 90
91-1	Fire Protection Engineering Criteria Testing Halon Fire Suppression Systems	2 Jan 91
91-2	High Altitude Electromagnetic Pulse (HEMP) Hardening in Facilities	4 Mar 91
91-4	Site Selection Criteria for Fire Protection Training Areas	14 Jun 91
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93-1	Construction Signs	11 Mar 93
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93-3	Inventory, Screening, Prioritization, and Evaluation of Existing Buildings for Seismic Risk	18 Aug 93
93-4	Fire Protection Engineering Criteria - Automatic Sprinkler Systems in Military Family Housing (MFH)	11 Aug 93
93-5	Fire Protection Engineering Criteria - Electronic Equipment Installations	22 Dec 93
94-1	Standard Airfield Pavement Marking Schemes	5 Apr 94
94-2	Utility Meters in New and Renovated Facilities	10 Jun 94

# SECTION B - OBSOLETE ETLs

No.	Date	Status
82-1	10 Nov 82	Superseded by ETL 83-10, 86-1, 87-4
82-3	10 Nov 82	Superseded by ETL 83-5, 84-2
82-4	10 Nov 82	Superseded by ETL 84-7
82-5	10 Nov 82	Superseded by ETL 84-1, 86-13, 86-14
82-6	30 Dec 82	Cancel led
82-7	30 Nov 82	Cancel led
83-2	16 Feb 83	Superseded by ETL 84-3
83-5	5 May 83	Superseded by ETL 84-2
83-6	24 May 83	Cancel led
83-10	28 Nov 83	Superseded by ETL 86-1
84-1	18 Jan 84	Superseded by ETL 86-14
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84-5	7 May 84	Superseded by ETL 84-8, 86-11, 86-18, 88-6
84-6	Not Issued	Cancel led/Not Used
84-8	19 Jun 84	Superseded by ETL 86-11
84-9	5 Jul 84	Superseded by ETL 88-7
88-5	2 Aug 88	Superseded by ETL 91-6
86-1	3 Feb 86	Superseded by ETL 87-7
86-3	21 Feb 86	Superseded by ETL 86-4
86-6	3 Jun 86	Superseded by ETL 86-11, 86-18, 88-6
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86-11	3 Jul 86	Superseded by ETL 88-6
86-12	3 Jul 86	Superseded by ETL 90-2
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88-8	4 Oct 88	Superseded by ETL 91-7
89-1	6 Feb 89	Superseded by ETL 90-4
89-5		Issued as ETL 90-7
91-8	24 Sep 91	Cancel ed
91-3	14 Jun 91	Superseded by MIL HDBK 1008B, Jan 94

# **ATTACHMENT NO. 9**

## **USAF Air Traffic Control Tower Design Guide**

An Electronic file (USAFCTDG.PDF) of this reference document is located on the toolbar of the advertised CD-ROM under the heading “SPECS”.

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**ATTACHMENT NO. 10**

**DEPARTMENT OF DEFENSE ANTITERRORISM  
CONSTRUCTION STANDARDS**

DRAFT



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# *Department of Defense Antiterrorism Construction Standards*

*XX, 2001*

*Supersedes 16 December 1999 Interim Department of Defense Antiterrorism /  
Force Protection Construction Standards*

*The Under Secretary of Defense (Acquisition, Technology, and Logistics)*

DRAFT

# DRAFT

## FOREWORD

This document is issued under the authority of DoD Instruction Number 2000.16, "DoD Combating Terrorism Program Standards," which requires DoD Components to adopt and adhere to common criteria and minimum construction standards to mitigate antiterrorism vulnerabilities and terrorist threats.

This document applies to the Office of the Secretary of Defense (OSD); the Military Departments (including their National Guard and Reserve Components); the Chairman, Joint Chiefs of Staff and Joint Staff; the Combatant Commands; the Office of the Inspector General of the Department of Defense; the Defense Agencies; the Department of Defense Field Activities; and all other organizational entities within the Department of Defense (hereafter referred to collectively as "the DoD Components").

The standards established by this document are minimums set for DoD. Each DoD Component may set more stringent antiterrorism construction standards to meet the specific threats in their areas of responsibility.

This document is effective immediately and is mandatory for use by all the DoD Components.

This document supersedes "Interim Department of Defense Antiterrorism/Force Protection Construction Standards," 16 December 1999, except that the Interim Standards will remain in effect for the Fiscal Year 2002 and 2003 Military Construction programs.

Users in the field are highly encouraged to submit comments on this document. Send recommended changes to:

Deputy Under Secretary of Defense (Installations and Environment)  
3400 Defense Pentagon  
Washington, DC 20301-3400

These comments should address content (accuracy, usefulness, consistency, and organization), writing, and appearance.

The DoD Components may obtain copies of this document through the U.S. Army Engineer District, Omaha, ATTN: CENWO-ED-ST, 12565 West Center Road, Omaha, NE 68144-3869. Other Federal Agencies may obtain copies from Department of the Army, U.S. Army Corps of Engineers, ATTN: CECW-EI, Washington, DC 20314-1000. Information in this document is exempt from mandatory public disclosure under provisions of FOIA, para. 5 USC 552(b)(2). Distribution of this document is restricted to U.S. Government agencies and their contractors only.

**DRAFT**

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# DRAFT

## REFERENCES

- (a) Department of Defense Interim Antiterrorism / Force Protection Construction Standards, December 16, 1999 (hereby cancelled).
- (b) DoD Instruction 2000.16, DoD Antiterrorism Standards, June 14, 2001.
- (c) DoD Handbook 2000.12-H, Protection of DoD Personnel and Activities Against Acts of Terrorism and Political Turbulence, February 1993.
- (d) American Society of Civil Engineers Standard (ANSI/ASCE) 7-98, Minimum Design Loads for Buildings and Other Structures, January 2000.
- (e) Unified Facility Criteria (UFC) 4-010-01. DoD Security Engineering Manual (Draft)
- (f) Sections 2805(a)(1) and 2805(c)(1) of Title 10, US Code
- (g) Security Engineering Working Group website <http://sewg.nwo.usace.army.mil>

**DRAFT****DL1. DEFINITIONS**

**DL1.1. Access road.** Any roadway within a controlled perimeter such as a maintenance, delivery, service, emergency, or other special limited use road ~~that~~ is necessary for the operation of the building within that perimeter.

**DL1.2. Billeting.** Any building or portion of a building in which 5 or more unaccompanied DoD personnel are routinely housed. For the purposes of these standards, billeting will also include Temporary Lodging Facilities and military family housing permanently converted to unaccompanied housing with 13 or more units per building. Billeting also applies to expeditionary and temporary structures with similar population densities and functions.

**DL1.3. Building hardening.** Enhanced conventional construction that mitigates limited standoff distance. Building hardening may also be considered to include the prohibition of certain building options.

**DL1.4. Building separation.** The distance between closest points on the exterior walls of adjacent buildings.

**DL1.5. Collateral damage.** Injury to personnel or damage to buildings that are not the primary target of an attack.

**DL1.6. Container structures.** Structures built using shipping containers that are designed to withstand structural loadings associated with shipping, including CONEX and ISO containers.

**DL1.7. Controlled perimeter.** A physical boundary at which personnel and vehicle access is controlled at the perimeter of an installation, an area within an installation, or another area with restricted access. Where the controlled perimeter includes a shoreline and there is no defined perimeter beyond the shoreline, the boundary will be at the mean high water mark.

**DL1.8. Conventional construction.** Building construction that is not specifically designed to resist weapons or explosives effects. Conventional construction is designed only to resist common loadings and environmental effects such as wind, seismic, and snow loads. Unreinforced masonry is excluded from conventional construction for the purposes of these standards.

**DL1.9. Design Basis Threat.** The threat (aggressors, tactics, and associated weapons, tools, or explosives) against which assets within a building must be protected and upon which the security engineering design of the building is based.

**DL1.10. DoD building.** Any building or portion of a building owned, leased, privatized, or otherwise occupied, managed, or controlled by or for DoD.

**DL1.11. DoD Components.** The Office of the Secretary of Defense (OSD); the Military Departments (including their National Guard and Reserve Components); the Chairman, Joint Chiefs of Staff and Joint Staff; the Combatant Commands; the Office of the Inspector General of the Department of Defense; the Defense Agencies; the Department of Defense Field Activities; and all other organizational entities within the Department of Defense.

**DL1.12. DoD personnel.** Any U.S. military, DoD civilian, or family member, host nation employees working for DoD, or contractors occupying DoD buildings.

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**DL1.13. Expeditionary structures** Those structures intended to be inhabited for no more than 1 year after they are erected. This group of structures typically include tents, Small and Medium Shelter Systems, Expandable Shelter Containers (ESC), ISO and CONEX containers, General Purpose Shelters, aircraft and vehicle maintenance, etc.

**DL1.14. Fabric Covered/Metal Frame construction.** A construction type that can be identified by a metal, load-bearing frame (usually aluminum) with some type of fabric (such as canvas) stretched or pulled over the frame. Examples of the types of structures that should be considered under this classification of structures include Frame-Supported Tensioned Fabric Structures (FSTFS), “Dome” Shelters, TEMPER Tents, Small and Medium Shelter Systems (SSS and MSS), General Purpose (GP) Medium Tents, and GP Large Tents.

**DL1.15. Family housing.** DoD owned or contracted quarters for DoD personnel and their dependents.

**DL1.16. Glazing.** The part of a window or door assembly that normally transmits light, but not air.

**DL1.17. Inhabited building.** Buildings or portions of buildings routinely occupied by five or more DoD personnel and with a population density of greater than one person per 40 gross square meters (430 gross square feet.) This density generally excludes industrial, maintenance, and storage facilities except for more densely populated portions of those buildings such as administrative areas. It also excludes family housing with 12 or fewer units per building. The inhabited building designation also applies to expeditionary and temporary structures with similar population densities.

**DL1.18. Laminated glass.** Multiple sheets of glass bonded together by a bonding interlayer.

**DL1.19. Level of protection.** The degree to which an asset (person, equipment, object, etc.) is protected against injury or damage from an attack.

**DL1.20. Mass notification.** Capability to provide real-time information to all building occupants or personnel in the immediate vicinity of a building during emergency situations.

**DL1.21. Medical transitional structures and spaces.** Structures that are erected or leased for temporary occupancy to maintain mission critical medical care during construction, renovation, modification, repair or restoration of an existing medical structure. Examples include urgent, ambulatory, and acute care operations.

**DL1.22. Parking.** Areas designated where vehicles may be left unattended.

**DL1.23. Primary gathering building.** Inhabited buildings or portions thereof where 50 or more DoD personnel routinely gather, and family housing with 13 or more family units per building. The primary gathering building designation also applies to expeditionary and temporary structures with similar population densities.

**DL1.24. Progressive collapse.** A chain reaction failure of building members to an extent disproportionate to the original localized damage. Such damage may result in upper floors of a building collapsing onto lower floors.

**DL1.25. Roadways.** Any surface intended for motorized vehicle traffic.

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1 **DL1.26. Routinely occupied.** For the purposes of these standards, an established or predictable pattern  
2 of activity within a building that terrorists could recognize and exploit.  
3

4 **DL1.27. Security engineering.** The process of identifying practical, risk managed short and long term  
5 solutions to reduce and/or mitigate dynamic man-made hazards by integrating multiple factors, including  
6 construction, equipment, manpower, and procedures.  
7

8 **DL1.28. Specific threat.** Known or postulated aggressor activity focused on targeting a particular asset.  
9

10 **DL1.29. Standoff distance.** A distance maintained between an exterior wall of a building and the  
11 potential location for an explosive detonation.  
12

13 **DL1.30. Structure group.** A cluster of expeditionary or temporary structures consisting of multiple  
14 rows of individual structures.  
15

16 **DL1.31. Structural glazed window systems.** Window systems in which glazing is bonded to the  
17 window frame using a high-strength, high performance silicone sealant.  
18

19 **DL1.32. Superstructure.** The supporting elements of a building above the foundation.  
20

21 **DL1.33. Temporary structures** Those structures that are erected with an expected occupancy of 3  
22 years or less. This group of structures typically includes, but is not limited to, such things as Southeast  
23 Asia (SEA) Huts, hardback tents, ISO and CONEX containers, pre-engineered buildings, trailers, and  
24 stress tensioned shelters.  
25

26 **DL1.34. TNT equivalent weight.** The weight of TNT (trinitrotoluene) that has an equivalent energetic  
27 output to that of a different weight of another explosive compound.  
28

29 **DL1.35. Wood Frame/Rigid Wall construction.** Structure types composed of wood frames or rigid  
30 wall construction using other than wood such as honeycomb panels and stressed skins. Examples include  
31 Expandable Shelter Containers (ESC), General Purpose (GP) Shelters, Aircraft Hangers (ACH), UBK  
32 Kabins, Southeast (SEA) Huts, trailers, and hardback tents.  
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**DRAFT****C1. CHAPTER 1****INTRODUCTION**

**C1.1. GENERAL.** This document represents a significant commitment by DoD to seek effective ways to minimize the likelihood of mass casualties from terrorist attacks against our personnel in the buildings in which they work and live.

**C1.1.1. Dynamic threat environment.** Terrorism is real, evolving, and continues to increase in frequency and lethality throughout the world. The unyielding, tenacious, and patient nature of the terrorists targeting DoD interests forces us to closely examine existing policies and practices for deterring, disrupting, and mitigating potential attacks. Today, terrorist attacks can impact anyone, at any time, at any location, and can take many forms. Deterrence against terrorist attacks begins with properly trained and equipped DoD personnel employing effective procedures. While terrorists have many tactics available to them, they frequently use explosive devices when they target large numbers of DoD personnel. Most existing DoD buildings offer little protection from terrorist attacks. By applying the DoD Antiterrorism Construction Standards described in this document, we become a smaller target of opportunity for terrorists.

**C1.1.2. Responsibility.** The heads of the DoD Components shall ensure compliance with these standards, but it is ultimately the commanders' responsibility to manage and mitigate the risk of DoD personnel being killed or injured in a terrorist attack. All DoD personnel have an inherent responsibility to minimize opportunities for terrorists to target them, their co-workers, and their families. Other critical DoD assets must also be identified and similarly safeguarded, but protection of those assets is beyond the scope of these standards. Within the range of potential threats and site specific issues and constraints, available personnel and resources must be properly focused, synchronized, and integrated before effective measures can be identified, implemented, and refined for each installation and activity.

**C1.1.3. Planning and integration.** When the best procedures, proper training, and appropriate equipment fail to deter terrorist attacks, adherence to these standards goes far in mitigating the possibility of mass casualties from terrorist attacks against DoD personnel in the buildings in which they work and live. Although predicting the specific threat to everyone is not possible, proper planning and integration of those plans provides a solid foundation for preventing, and if necessary reacting, when terrorist incidents or other emergencies unfold. An effective planning process facilitates the necessary decision making, clarifies roles and responsibilities, and ensures support actions generally go as planned. This planning process is executed by a team consisting of people from the chain of command and key personnel from all appropriate functional areas who have an interest in the building and its operation. The team should include, as a minimum, intelligence, security, and facility engineering personnel. This team is responsible for identifying requirements for the project, facilitating the development of supporting operational procedures, obtaining adequate resources, and properly supporting all other efforts needed to prudently enhance protection of the occupants of every inhabited DoD building. For further information on planning and integration, refer to the DoD Security Engineering Manual.

**C1.2. STANDARDS AND RECOMMENDATIONS.** Mandatory DoD antiterrorism construction standards for new and existing inhabited buildings are contained in Appendix AP1. Additional recommended measures for new and existing inhabited buildings are included in Appendix AP2. Mandatory DoD antiterrorism construction standards for expeditionary and temporary structures are contained in Appendix AP3.

**C1.3. INTENT.** The intent of these standards is to minimize the possibility of mass casualties in buildings or portions of buildings owned, leased, privatized, or otherwise occupied, managed, or

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controlled by or for DoD. These standards provide appropriate, implementable, and enforceable measures to establish a level of protection against terrorist attacks for all inhabited DoD buildings where no known threat of terrorist activity currently exists. While complete protection against all potential threats for every inhabited building is cost prohibitive, the intent of these standards can be achieved through prudent master planning, real estate acquisition, and construction practices. Where the minimum standoff distances detailed in these standards are met, most conventional construction techniques can be used with only marginal impact on the total construction or renovation cost. The financial impact of these standards will be significantly less than the economic and intangible costs of a mass casualty event.

**C1.4. LEVELS OF PROTECTION.** The levels of protection provided by these standards meet the intent described above and establish a foundation for the rapid application of additional protective measures in a higher threat environment. These standards may be supplemented where specific terrorist threats are identified, where more stringent local standards apply, or where local commanders dictate additional measures. Detailed descriptions of the levels of protection are provided in Chapter 2 and the DoD Security Engineering Manual.

**C1.4.1. DoD Component standards.** Where DoD Component standards such as geographic CINC standards address unique requirements, those standards will be incorporated in accordance with their implementing directives, but not to the exclusion of these standards.

**C1.4.2. Threat specific requirements.** Where a design basis threat is identified whose mitigation requires protective measures beyond those required by these standards or DoD Component standards, those measures will be developed in accordance with the provisions of the DoD Security Engineering Manual. The provisions of the DoD Security Engineering Manual include the design criteria that will be the basis for the development of the protective measures, estimates of the costs of those measures, and detailed guidance for developing the measures required to mitigate the identified threat. The design criteria include the assets to be protected, the threat to those assets, and the desired level of protection. Use of the DoD Security Engineering Manual will ensure uniform application, development, and cost estimation of protective measures throughout DoD.

**C1.5. APPLICABILITY.** These standards apply to all DoD Components, to all DoD inhabited buildings, and to all DoD expeditionary and temporary structures in accordance with the following:

**C1.5.1. New construction.** Implementation of these standards is mandatory for all new construction regardless of funding source in accordance with the following:

**C1.5.1.1. Military Construction (MILCON).** These standards apply to MILCON projects starting with the Fiscal Year 2004 Program. Projects programmed or designed under the DoD Interim Antiterrorism / Force Protection Construction Standards do not have to be reprogrammed or redesigned to meet the requirements of these standards. The provisions of the Interim Standards will apply to those projects. Due to minor changes between these standards and the Interim Standards, projects prior to the Fiscal Year 2004 Program should comply with these standards where possible.

**C1.5.1.2. Other funding sources.** These standards apply to all new construction projects funded by sources other than MILCON (including host nation and other foreign government funding) starting with Fiscal Year 2004. Projects funded prior to that fiscal year should comply with these standards where possible.

**C1.5.2. Existing buildings.** These standards will apply to existing facilities starting with the Fiscal Year 2004 program when triggered as specified below, regardless of funding source. Projects funded prior to that fiscal year should comply with these standards where possible.

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2 **C1.5.2.1. Major investments.** Implementation of these standards to bring an entire  
3 building into compliance is mandatory for all DoD building renovations, modifications, repairs, and  
4 restorations where those costs exceed 50% of the replacement cost of the building except as otherwise  
5 stated in these standards. The 50% cost is exclusive of the costs identified to meet these standards.  
6 Where the 50% threshold is not met, compliance with these standards is recommended.  
7

8 **C1.5.2.2. Conversion of use.** Implementation of these standards is mandatory any time  
9 a building or portion thereof is modified from its current use to use as an inhabited building, billeting, or a  
10 primary gathering building. Examples would be a warehouse (uninhabited) being converted to  
11 administrative (inhabited) use and an inhabited administrative building being converted to a primary  
12 gathering building or billeting.  
13

14 **C1.5.2.3. Glazing replacement.** Implementation of the glazing provisions of these  
15 standards is mandatory for existing inhabited buildings whenever there is a planned window or door  
16 glazing replacement project. Such replacements may require window frame modification or replacement.  
17

18 **C1.5.3. Building additions.** Additions to existing inhabited buildings shall comply with the  
19 standards for new construction. If the addition is 50% or more of the gross area of the existing building,  
20 the existing building shall comply with the standards for existing construction. All additions to inhabited  
21 buildings shall be structurally independent of the existing buildings.  
22

23 **C1.5.4. Leased buildings.** Implementation of these standards is mandatory for all facilities  
24 leased for DoD use and for those buildings in which DoD receives a space assignment from another  
25 government agency. This requirement is intended to cover all situations, including General Services  
26 Administration space, privatized buildings, and host-nation and other foreign government buildings. This  
27 requirement is applicable for all new leases executed after 1 October 2003. This requirement also applies  
28 to renewal or extension of any existing lease after 1 October 2006. Leases executed prior to the above  
29 fiscal years will comply with these standards where possible.  
30

31 **C1.5.4.1. Partial occupancy.** These standards only apply where DoD personnel occupy  
32 leased or assigned space constituting at least 25 percent of the total floor area, and they only apply to that  
33 portion of the building that is occupied by DoD personnel.  
34

35 **C1.5.4.2. New buildings.** Buildings that are built to lease to DoD as of the effective  
36 date established above shall comply with the standards for new construction.  
37

38 **C1.5.4.3. Existing buildings.** For new leases of existing buildings or renewals of leases,  
39 the standards for existing buildings shall apply in accordance with the effective dates established above.  
40 For those existing buildings, protective measures other than those specified in this standard may be used  
41 if they provide similar levels of protection to those required by this standard. An example would be using  
42 fragment retention film on existing glass instead of replacing it with laminated glass. Refer to the DoD  
43 Security Engineering Manual for guidance on mitigating measures.  
44

45 **C1.5.5. Expeditionary and Temporary Structures.** Implementation of these standards is  
46 mandatory for all expeditionary and temporary structures that meet the occupancy criteria for inhabited or  
47 primary gathering buildings or billeting. See Appendix AP3 for structure types that meet the  
48 expeditionary and temporary structures criteria.  
49

50 **C1.5.5.1. New structures.** These standards apply to all new expeditionary sites  
51 effective immediately.

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**C1.5.5.2. Existing structures.** These standards will apply to all existing expeditionary activities beginning in Fiscal Year 2004.

**C1.5.6. Exemptions.** Unless DoD components dictate otherwise, the following buildings are exempt from requirements of these standards as specified below. However, compliance with these standards for those buildings is recommended where possible. Exemptions to elements of individual standards are included in the text of those standards in appendix AP1. The rationale for all exemptions is detailed in chapter 2.

**C1.5.6.1. Stand-alone franchised food operations.** These buildings are exempt from standoff distances to parking and roadways. All other standards apply.

**C1.5.6.2. Stand alone shoppettes, mini marts and similarly sized commissaries.** These buildings are exempt from standoff distances to parking and roadways. All other standards apply.

**C1.5.6.3. Family housing with 12 units or fewer per building.** These buildings are exempt from all provisions of these standards.

**C1.5.6.4. Medical transitional structures and spaces.** These structures are exempt from all provisions of these standards.

**C1.5.6.5. Gas stations and car care centers.** These facilities are exempt from all provisions of these standards.

## **C1.6. PROGRAMMING.**

**C1.6.1. Documentation.** The inclusion of these standards into DoD construction or the inclusion of protective measures above the requirements of these standards will be incorporated into the appropriate construction programming documents (such as the DD Form 1391) in accordance with DoD Component guidance. Refer to the DoD Security Engineering Manual for guidance on the costs for implementing these standards and for providing protective measures beyond these standards.

**C1.6.2. Funding Thresholds.** For existing construction, DoD AT construction standards are intended solely to correct design deficiencies to appropriately address life-threatening terrorist risks. As a result, funding thresholds for Unspecified Minor Military Construction and Operations and Maintenance funding may be increased in accordance with 10 USC Sections 2805(a)(1) and 2805 (c)(1).

**C1.7. INFORMATION SENSITIVITY.** Some information in this standard is exempt from mandatory disclosure under the Freedom of Information Act. The sensitive information that is exempt is the explosive weights upon which the minimum standoff distances are based. Allowing potential aggressors to know the minimum explosive weights that all DoD inhabited buildings are designed to resist could constitute a vulnerability. To minimize the possibility of that information being used against DoD personnel, the following provisions apply:

**C1.7.1. Distribution.** Follow governing DoD and Component guidance for specific requirements for handling and distribution of For Official Use Only information. In general, distribution of this document is authorized only to U.S. Government agencies and their contractors, although portions of the document that are not indicated to be For Official Use Only can be removed from the document and may be distributed to the public without limitation. In addition, where it is within Status of Forces Agreements (SOFA) or other similar information exchange agreements, the information in this standard



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1 may be distributed to host nation elements for the purposes of their administration and design of host  
2 nation funded or designed construction.  
3

4 **C1.7.2. Posting to the Internet.** Because this document is For Official Use Only it cannot be  
5 posted in its entirety to any web site that is accessible to the general public. It can, however, be posted if  
6 the For Official Use Only information is removed (Tables AP1.1. and AP3.1.) In addition, other  
7 documents that include information from this standard that is identified as For Official Use Only cannot  
8 be posted to web sites accessible to the general public. For Official Use Only information may be posted  
9 to protected, non-publicly accessible web sites that comply with standards established by DoD for  
10 administration of web sites.  
11

12 **C1.7.3. Plans and specifications.** Construction plans and specifications should include only that  
13 information from this document that is necessary for a contractor to develop a bid on a project. The  
14 explosive weights used in these standards shall not be entered into the plans and specifications unless the  
15 plans and specifications are properly safeguarded. Plans and specifications may be posted to the Internet  
16 in accordance with existing Component guidance, but such documents will not include For Official Use  
17 Only information. All plans and specifications for inhabited buildings shall include an annotation that  
18 cites the version of this standard that was used for design.  
19

20 **C1.7.4. Design – build contracts.** Where design – build contracts are employed, prospective  
21 contractors will be responsible for developing a design proposal for that project that may be impacted by  
22 provisions of these standards. Where that is the case, consider alternate means to provide sufficient  
23 information to support their proposals. Consider for example, either specifying specific design loads or  
24 specifying the required standoff distance and providing candidate structural systems that would allow for  
25 mitigation of the applicable explosive if that standoff was less than the minimum. Once the design –  
26 build contract is awarded the contractor will be eligible to receive this complete document for use in the  
27 development of the final design package, but that contractor will be responsible for protecting the  
28 integrity of the information throughout the contract and through any subcontracts into which that  
29 contractor might enter.  
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**DRAFT****C2. CHAPTER 2****PHILOSOPHY, ASSUMPTIONS, AND DESIGN STRATEGIES**

**C2.1. GENERAL.** The purpose of this chapter is to clarify the philosophy on which these standards are based, the assumptions inherent in their provisions, and the design strategies that are their foundation. Effective implementation of these standards depends on a reasonable understanding of the rationale for them. With this understanding, engineers and security and force protection personnel can maximize the efficiency of their solutions for complying with the standards while considering site-specific issues and constraints.

**C2.2. PHILOSOPHY.** The overarching philosophy upon which this document is based is that comprehensive protection against the range of possible threats may be cost prohibitive, but that an appropriate level of protection can be provided for all DoD personnel at a reasonable cost. That level of protection is intended to lessen the risk of mass casualties resulting from terrorist attacks. Full implementation of these standards will provide some protection against all threats and will significantly reduce injuries for the threats upon which these standards are based. The costs associated with those levels of protection are assumed to be less than the physical and intangible costs associated with incurring mass casualties. Furthermore, given what we know about terrorism, all DoD decision makers must commit to making smarter investments with our scarce resources, and stop investing money in inadequate buildings that DoD personnel will have to occupy for decades, regardless of the environment. There are three key elements of this philosophy that influence the implementation of these standards.

**C2.2.1. Time.** Protective measures needed to provide the appropriate level of protection must be in place prior to the initiation of a terrorist attack. Incorporating those measures into DoD buildings is least expensive at the time those buildings are either being constructed or are undergoing major renovation, repair, restoration, or modification.

**C2.2.2. Master planning.** Many of these standards significantly impact master planning. The most significant such impact will be in standoff distances. If standoff distances are not “reserved” they will be encroached upon and will not be available should they become necessary in a higher threat environment. The master planning implications of these standards are not intended to be resolved overnight. They should be considered to be a blueprint for facilities and installations that will be implemented over decades as those facilities and installations evolve.

**C2.2.3. Design practices.** The philosophy of these standards is to build greater resistance to terrorist attack into all inhabited structures. That philosophy affects the general practice of designing inhabited buildings. While these standards are not based on a known threat, they are intended to provide the easiest and most economical methods to minimize injuries and fatalities in the event of a terrorist attack. The primary methods to achieve this outcome are to maximize standoff distance, to reduce flying debris hazards, and to construct superstructures to avoid progressive collapse. These and related design issues are intended to be incorporated into standard design practice in the future.

**C2.3. ASSUMPTIONS.** Several assumptions form the foundation for these standards.

**C2.3.1. Baseline threat.** The location, size, and nature of terrorist threats are unpredictable. These standards are based on a specific range of assumed threats that provides a reasonable baseline for the design of all inhabited DoD buildings. Designing to resist baseline threats will provide general protection today and will establish a foundation upon which to build additional measures where justified by higher threats or where the threat environment increases in the future. While those baseline threats are less than some of the terrorist attacks that have been directed against U.S. personnel in the past, it would

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be cost prohibitive to provide protection against the worst-case scenario in every building. The terrorist threats addressed in these standards are further assumed to be directed against DoD personnel. Threats to other assets and critical infrastructure are beyond the scope of these standards, but they are addressed in the DoD Security Engineering Manual. The following are the terrorist tactics upon which these standards are based:

**C.2.3.1.1. Explosives.** The baseline explosive weights are identified in Tables AP1.1 and AP3.1 as explosive weight I, II, and III. Their means of delivery are discussed below.

**C2.3.1.1.1. Vehicle bombs.** For the purposes of these standards, the vehicle bomb is assumed to be a stationary vehicle bomb. The sizes of the explosives in the vehicle bombs are based on studies that have shown that quantities of explosives associated with explosive weight I (in equivalent weight of TNT) are likely to be detected in a vehicle during a search. Therefore, explosive weight I is the basis for the standoff distances associated with the controlled perimeter. The quantity of explosives associated with explosive weight II is assumed to be able to enter the controlled perimeter undetected; therefore, explosive weight II is the basis for the standoff distances for roadways and parking. Explosive weight II was selected because it represents a tradeoff between likelihood of detection and the risk of injury or damage.

**C2.3.1.1.2. Waterborne vessel bombs.** For the purposes of these standards, waterborne vehicles will also be assumed to contain quantities of explosives associated with explosive weight I. That weight was selected because areas beyond the shoreline are assumed not to be controlled perimeters.

**C2.3.1.1.3. Placed bombs.** Hand carried explosives placed near buildings can cause significant localized damage, potentially resulting in injuries or fatalities. It is assumed that aggressors will not attempt to place explosive devices in areas near buildings where those devices could be visually detected by building occupants casually observing the area around the building. It is also assumed that there will be sufficient controls to preclude placed bombs being brought into buildings. Explosive weight II is assumed to be placed by hand either in trash containers or in the immediate vicinity of buildings. That quantity of explosives is further assumed to be built into a bomb 150 millimeters (6-inches) or greater in height.

**C2.3.1.1.4. Mail bombs.** Explosives in packages delivered through the mail can cause significant localized damage, injuries, and fatalities if they detonate inside a building. No assumption as to the size of such explosives is made in these standards. Provisions for mail bombs are limited to locations of mailrooms so that they can be more readily hardened if a specific threat of a mail bomb is identified in the future.

**C2.3.1.2. Indirect fire weapons.** For the purpose of these standards, indirect fire weapons are assumed to be military mortars with fragmentation rounds with explosive contents equivalent to explosive weight III in Tables AP1.1 and AP3.1. Protection against the effects of such rounds on an individual building is not considered practical as a minimum standard; therefore, these standards are intended to limit collateral damage to adjacent buildings from these weapons.

**C2.3.1.3. Small arms.** Small arms include weapons that fire rounds of a wide variety of calibers. Some standards in this document are predicated on a small arms threat. Provisions of those standards are based on the assumption that those weapons will be fired from vantage points outside the control of an installation or facility. Obscuration or screening that minimizes targeting opportunities is assumed to be the primary means of protecting DoD personnel from these weapons in these standards.

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**C2.3.1.4. Chemical, biological, and radiological weapons.** For the purposes of these standards these weapons are assumed to be improvised weapons containing airborne agents employed by terrorists. These standards do not assume comprehensive protection against this threat. They provide means to reduce the potential for widespread dissemination of such agents throughout a building in the event of an attack.

**C2.3.2. Controlled perimeter.** These standards assume that procedures are implemented that would limit the likelihood that a vehicle carrying quantities of explosives equivalent to explosive weight I in Tables AP1.1 and AP3.1 could penetrate a controlled perimeter undetected. It is further assumed that any entry control point will include provisions to reject vehicles without penetrating the controlled perimeter.

**C2.3.3. Levels of protection.** The potential levels of protection are described in Tables C2.1, C2.2, and C2.3. These standards provide **Low** level of protection for billeting and primary gathering buildings and a **Very Low** level of protection for other inhabited buildings. Greater protection is provided for primary gathering buildings and billeting because of the higher concentration of personnel and the more attractive nature of the target. If the minimum standoff distances are provided, or if mitigating measures are provided to achieve an equivalent level of protection, and if the threats are no greater than those indicated in Tables AP1.1 and AP3.1, the risk of injuries and fatalities will be minimized. Threats higher than those envisioned in Tables AP1.1 and AP3.1 will increase the likelihood of injuries and fatalities, regardless of the level of protection. Refer to the DoD Security Engineering Manual for detailed guidance on levels of protection and how to achieve them for a wide range of threats.

**C2.3.4. Minimum standoff distances.** The minimum standoff distances identified in Tables AP1.1 and AP3.1 were developed to provide survivable structures for a wide range of conventional buildings and expeditionary/temporary structures. These buildings range from tents and wood framed buildings to reinforced concrete buildings. The standoff distances in the “Conventional Construction Without Analysis” column in Table AP1.1 are based on explosive safety considerations that have been developed based on years of experience and observation. Those standoff distances may be conservative for heavy construction such as reinforced concrete or reinforced masonry; however, they may be just adequate for lighter weight construction. The standoff distances in Table AP3.1 are based on blast testing conducted against TEMPER Tents, SEA Huts, General Purpose Shelters, and Small Shelter Systems. With adequate analysis those distances may be able to be reduced without requiring mitigating measures. For a more detailed discussion of this issue, refer to the DoD Security Engineering Manual.

**C2.3.5. Exempted building types.** The rationale for some building types being exempted from these standards or elements of these standards is detailed below:

**C2.3.5.1. Shoppettes, mini marts, similarly sized commissaries and stand-alone franchised food operations.** These facilities by the nature of their operation require parking in close proximity; therefore, they are exempted from the minimum standoff distances for parking and roadways. Applying other upgrades required by these standards is feasible, however, and will lessen the risk of mass casualties.

**C2.3.5.2. Family housing.** The exemption of family housing with 12 units or fewer in a single building acknowledges that the density of such units is generally low, reducing the likelihood of mass casualties. It also acknowledges the fact that family housing has rarely been directly targeted by terrorists. A further assumption for existing family housing with 13 or more units per building is that by designating parking spaces for specific residents or residences, the risk of parking vehicle bombs in those parking areas is reduced due to increased awareness of the vehicles that are authorized to park there.

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Table C2.1 Levels of Protection – New Construction

<b>Level of Protection</b>	<b>Potential Structural Damage</b>	<b>Potential Door and Glazing Hazards</b>	<b>Potential Injury</b>
<b>Very Low</b>	Heavily damaged - onset of structural collapse: Major deformation of primary and secondary structural members, but progressive collapse is unlikely. Collapse of non-structural elements.	Glazing will break and is likely to be propelled into the building, resulting in serious glazing fragment injuries, but fragments will be reduced. Doors may be propelled into rooms, presenting serious hazards.	Majority of personnel suffer serious injuries. There are likely to be a limited number (10% to 25%) of fatalities.
<b>Low</b>	Damaged – unrepairable. Major deformation of non-structural elements and secondary structural members and minor deformation of primary structural members, but progressive collapse is unlikely.	Glazing will break, but fall within 1 meter of the wall or otherwise not present a significant fragment hazard. Doors may fail, but they will rebound out of their frames, presenting minimal hazards.	Majority of personnel suffer significant injuries. There may be a few (<10%) fatalities.
<b>Medium</b>	Damaged – repairable. Minor deformations of non-structural elements and secondary structural members and no permanent deformation in primary structural members.	Glazing will break, but will remain in the window frame. Doors will stay in frames, but will not be reusable.	Some minor injuries, but fatalities are unlikely.
<b>High</b>	Superficially damaged. No permanent deformation of primary and secondary structural members or non-structural elements.	Glazing will not break. Doors will be reusable.	Only superficial injuries are likely.

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Table C2.2 Levels of Protection – Existing Construction

<b>Level of Protection</b>	<b>Potential Structural Damage</b>	<b>Potential Door and Glazing Hazards</b>	<b>Potential Injury</b>
<b>Very Low</b>	Heavily damaged - onset of structural collapse: Major deformation of primary structural members, but progressive collapse is unlikely. Collapse of secondary structural members and non-structural elements.	Glazing will break and is likely to be propelled into the building, resulting in serious glazing fragment injuries, but fragments will be reduced. Doors may be propelled into rooms, presenting serious hazards.	Majority of personnel suffer serious injuries. There are likely to be a limited number (10% to 25%) of fatalities.
<b>Low</b>	Damaged – unrepairable. Major deformation of secondary structural members and minor deformation of primary structural members, but progressive collapse is unlikely. Collapse of non-structural elements.	Glazing will break and is likely to be propelled into the building, but should result in survivable glazing fragment injuries. Doors may fail, but they will rebound out of their frames, presenting minimal hazards.	Majority of personnel suffer significant injuries. There may be a few (<10%) fatalities.
<b>Medium</b>	Damaged – repairable. Minor deformations of secondary structural members and no permanent deformation in primary structural members. Major deformation of non-structural elements.	Glazing will break, but will remain in the window frame. Doors will stay in frames, but will not be reusable.	Some minor injuries, but fatalities are unlikely.
<b>High</b>	Superficially damaged. No permanent deformation of primary and secondary structural members or non-structural elements.	Glazing will not break. Doors will be reusable.	Only superficial injuries are likely.

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Table C2.3 Levels of Protection – Expeditionary/Temporary Construction		
<b>Level of Protection</b>	<b>Potential Structural Damage</b>	<b>Potential Injury</b>
<b>Very Low</b>	Heavily damaged. Major portions of the structure will collapse (over 50%). A significant percentage of secondary structural members will collapse (over 50%)	Majority of personnel suffer serious injuries. There are likely to be a limited number (10% to 25%) of fatalities.
<b>Low</b>	Damaged – unrepairable. Some sections of the structure may collapse or lose structural capacity (10 to 20% of structure).	Majority of personnel suffer significant injuries. There may be a few (<10%) fatalities.
<b>Medium</b>	Damaged – repairable. Minor to major deformations of both structural and non-structural. Some secondary debris will be likely, but the structure remains intact with collapse unlikely.	Some minor injuries, but no fatalities are likely.
<b>High</b>	Superficially damage. No permanent deformation of primary and secondary structural members or non-structural elements.	Only superficial injuries are likely.

3

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1           **C2.3.5.3. Gas stations and car care centers.** These facilities are exempted from these  
2 standards because, by the nature of their operation, cars must be allowed to be in close proximity to them.  
3 Other measures included in these standards would be ineffective in the absence of any control on  
4 vehicles. In addition, these facilities are not routinely occupied by 5 or more personnel.  
5

6           **C2.3.5.4. Medical transitional structures and spaces.** These structures and spaces  
7 may be required for limited durations to maintain mission critical operations during construction that  
8 require close proximity or physical connection to the existing building undergoing construction. This  
9 may make compliance with these standards impractical during the limited construction duration.  
10

11           **C2.3.6. Policies and procedures.** Policies and procedures are a critical adjunct to construction  
12 standards. It is assumed that there are means to control access to controlled perimeters, underground  
13 parking, and other locations where vehicle access needs to be limited. It is further assumed that unusual  
14 packages or containers or improperly parked vehicles will be recognized as potential terrorist threats and  
15 appropriate reactive measures will be implemented to reduce the potential for casualties. Finally, it is  
16 assumed that policies and procedures will be developed to support these and other related issues and that  
17 those policies and procedures will be incorporated into antiterrorism plans, training, and exercises.  
18

19           **C2.3.7. Training.** It is assumed that key security and facility personnel will receive training in  
20 security engineering, antiterrorism, and related areas. Refer to the Security Engineering Working Group  
21 website for available training and to DoD 2000.12-H for additional information on training issues. It is  
22 further assumed that all DoD personnel have been trained in basic antiterrorism awareness in accordance  
23 with DODI 2000.16, that they are able to recognize potential threats, and that they know the proper  
24 courses of action should they detect a potential threat.  
25

26           **C2.3.8. Design codes.** It is assumed that the provisions of these standards will be coordinated  
27 with all other applicable building and design codes and Federal building policies. Nothing in these  
28 standards should be interpreted to supercede the provisions of any other applicable building or design  
29 code. Where other codes mandate more stringent requirements it is assumed that the provisions of those  
30 codes will be followed.  
31

32           **C2.3.9. Expeditionary and temporary structures.** Expeditionary and temporary structures are  
33 commonly built of either combinations of metal frames and fabric or wood frames and rigid walls.  
34 It is assumed that most expeditionary and temporary structures cannot be retrofitted or hardened  
35 sufficiently for higher threats; therefore, unless adequate planning is done to obtain the needed space to  
36 achieve appropriate standoff, DoD personnel will be highly vulnerable to terrorist attack.  
37

38           **C2.4. DESIGN STRATEGIES.** There are seven major design strategies that are applied throughout  
39 these standards. They do not account for all of the measures considered in the standards, but they were  
40 the most effective and economical in protecting DoD personnel from terrorist attacks. These strategies are  
41 summarized below.  
42

43           **C2.4.1. Maximize standoff distance.** The primary design strategy is to keep terrorists as far  
44 away from inhabited DoD buildings as possible. The easiest and least costly opportunity for achieving  
45 the appropriate levels of protection against terrorist threats is to incorporate sufficient standoff distance  
46 into project designs. While sufficient standoff distance is not always available to provide the minimum  
47 standoff distances required for conventional construction, maximizing the available standoff distance  
48 always results in the most cost effective solution. Maximizing standoff distance also ensures that there is  
49 opportunity in the future to upgrade buildings to meet increased threats or to accommodate higher levels  
50 of protection.  
51



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1       **C2.4.2. Prevent building collapse.** Provisions relating to preventing building collapse and  
2 building component failure are essential to effectively protecting building occupants. Designing those  
3 provisions into buildings during new construction or retrofitting during major renovations, repairs,  
4 restorations, or modifications of existing buildings is the most cost effective time to do that.

5  
6       **C2.4.3. Minimize hazardous flying debris.** In past explosive events where there was no  
7 building collapse, a high number of injuries resulted from flying glass fragments and debris from walls,  
8 ceilings, and fixtures (non-structural features.) The glass used in most windows breaks at very low blast  
9 pressures resulting in hazardous, dagger-like shards. Minimizing those hazards has a major effect on  
10 limiting mass casualties. Window and door designs must treat glazing, frames, connections, and the  
11 structural components to which they are attached as an integrated system. Hazardous fragments may also  
12 include secondary debris such as those from concrete barriers and site furnishings.

13  
14       **C2.4.4. Provide effective building layout.** Simple changes in building layout and orientation  
15 can significantly reduce opportunities for terrorists to target building occupants or injure large numbers of  
16 people.

17  
18       **C2.4.5. Limit airborne contamination.** Simple changes to heating, ventilation, and air  
19 conditioning (HVAC) systems can significantly reduce the potential for chemical, biological, and  
20 radiological agents being distributed throughout buildings.

21  
22       **C2.4.6. Provide mass notification.** Providing a timely means to notify building occupants of  
23 threats and what should be done in response to those threats reduces the risk of mass casualties.

24  
25       **C2.4.7. Facilitate future upgrades.** Many of the provisions of these standards facilitate  
26 opportunities to upgrade building protective measures in the future if the threat environment changes.  
27

**DRAFT****AP1. APPENDIX 1****DoD ANTITERRORISM MINIMUM CONSTRUCTION STANDARDS  
FOR NEW AND EXISTING BUILDINGS**

**AP1.1. SITE PLANNING.** Operational, logistic, and security requirements must be integrated in the overall design of buildings, equipment, landscaping, parking, roads, and other features. The most cost-effective solution to mitigating explosive effects on buildings is to keep explosives as far as possible from them. Standoff distance must be coupled with appropriate building hardening to provide the necessary level of protection to DoD personnel. The following standards detail minimum standoff distances that when achieved will allow for buildings to be built with minimal additional construction costs. Where these standoff distances cannot be achieved because land is unavailable, the standards allow for building hardening to mitigate the blast effects. Costs and requirements for building hardening are addressed in the DoD Security Engineering Manual.

**AP1.1.1. Standard 1. Minimum Standoff Distances.** The minimum standoff distances apply to all new and existing (when triggered) DoD buildings covered by these standards. The minimum standoff distances are presented in Table AP1.1 and illustrated in Figures AP1.1 and AP1.2. Where the standoff distances in the “Conventional Construction Without Analysis” column of Table AP1.1 can be met, conventional construction may be used for the buildings without a specific analysis of blast effects, except as otherwise required in these standards. Where those distances are not available, the building must be analyzed by a qualified engineer and hardened as necessary to mitigate the effects of the explosives indicated in Table AP1.1 at the achievable standoff distance to the appropriate level of protection. The appropriate levels of protection for each building category are shown in Table AP1.1 and are described in Tables C2.1 and C2.2 and in the DoD Security Engineering Manual. Standoff distances of less than those shown in the “Conventional Construction With Analysis” column in Table AP1.1 are not allowed.

**AP1.1.1.1. Controlled perimeter.** The standoff distance will be measured from the closest point on the building exterior to the controlled perimeter.

**AP1.1.1.2. Parking and roadways.** Standoff distances for parking and roadways are based on the assumption that there is a controlled perimeter at which larger vehicle bombs will be detected and kept from entering the controlled perimeter. Where there is a controlled perimeter, the standoff distances and explosive weight associated with parking and roadways in Table AP1.1 apply. If there is no controlled perimeter, it must be assumed that the larger explosive weights upon which the controlled perimeter standoff distances are based (explosive weight I from Table AP1.1.) can access parking and roadways near buildings. Therefore, where there is no controlled perimeter, standoff distances from parking and roadways will be in accordance with the distances and the explosive weight associated with controlled perimeters in Table AP1.1. In addition the following apply:

**AP1.1.1.2.1. All inhabited buildings.** The standoff distance will be measured from the closest point on the building exterior to the closest edge of parking areas and roadways. The minimum standoff for all buildings regardless of hardening or analysis will be 10 meters for both parking areas and roadways.

**AP1.1.1.2.2. Existing inhabited buildings.** Where possible, move parking and roadways away from existing buildings in accordance with the standoff distances and explosive weights in Table AP1.1. It is recognized, however, that moving existing parking areas and roadways or applying structural retrofits may be impractical; therefore, the following operational options are provided for existing inhabited buildings:

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1  
2  
3 **AP1.1.1.2.2.1. Surface parking areas.** Establish entry control to  
4 portions of surface parking areas that are closer than the required standoff distance to ensure unauthorized  
5 vehicles are not allowed closer than the required standoff distance. For primary gathering buildings and  
6 billeting if entry control is provided to prevent unauthorized parking within the required standoff distance,  
7 controlled surface parking may be permitted as close as 10 meters (33 feet) without hardening or analysis.

8  
9 **AP1.1.1.2.2.2. Roadways.** Eliminate parking on roadways within the  
10 required standoff distances along roads adjacent to existing buildings covered by these standards.

11  
12 **AP1.1.1.2.3. Family housing.** For existing family housing with 13 or more  
13 units per building within a controlled perimeter, parking within the required standoff distances may be  
14 allowed where designated parking spaces are assigned for specific residents or residences. Where there  
15 are existing standoff distances less than the required standoff distances, those existing distances shall not  
16 be encroached upon.

17  
18 **AP1.1.1.3. Parking and roadway projects.** Where practical, all roadway and parking  
19 area projects should comply with the standoff distances from inhabited buildings in Table AP1.1. Where  
20 parking or roadways that are within the standoff distances in Table AP1.1 from existing buildings are  
21 being constructed, expanded, or relocated, those parking areas and roadways shall not be allowed to  
22 encroach on the existing standoff distances of any existing inhabited building. That applies even where  
23 such projects are not associated with a building renovation, modification, repair, or restoration requiring  
24 compliance with these standards

25  
26 **AP1.1.1.4. Trash containers.** The standoff distance will be measured from the closest  
27 point on the building exterior to the nearest point of the trash container or trash container enclosure.  
28 Where the standoff distance is not available, hardening of trash enclosures to mitigate the direct blast  
29 effects and secondary fragment effects of the explosive on the building is acceptable if the applicable  
30 level of protection can be proven by analysis. If trash enclosures are completely enclosed on all sides and  
31 the top to preclude introduction of objects into the enclosures and the enclosures are secured so that  
32 unauthorized personnel cannot access them, they can be located closer to the building as long as they do  
33 not violate the unobstructed space provisions of Standard 3. Openings in screening materials and gaps  
34 between the ground and screens or walls making up an enclosure will not be greater than 150 mm (six  
35 inches).

36  
37 **AP1.1.2. Standard 2. Building separation.** Building separation requirements are established  
38 to minimize the possibility that an attack on one building causes injuries or fatalities in adjacent buildings.  
39 The separation distance is predicated on the potential use of indirect fire weapons.

40  
41 **AP1.1.2.1. Billeting and primary gathering buildings.** For all new billeting and  
42 primary gathering buildings ensure that adjacent inhabited buildings are separated by at least the distances  
43 in Table AP1.1. Where it is necessary to encroach on those building separations, analyze the structure  
44 and provide hardened building components as necessary to mitigate the effects of the explosive indicated  
45 in Table AP1.1 to the appropriate level of protection shown in Table AP1.1. Levels of protection are  
46 described in Table C1.1 and in the DoD Security Engineering Manual.

47  
48 **AP1.1.2.2. Other inhabited buildings.** There are no minimum separation distances  
49 required for antiterrorism purposes for inhabited buildings.

50  
51 **AP1.1.3. Standard 3. Unobstructed space.** It is assumed that aggressors will not attempt to  
place assets in areas near buildings where their explosive devices could be visually detected by building

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occupants observing the area around the building. Therefore, ensure that obstructions within 10 meters (33 feet) of buildings covered by these standards do not allow for concealment from observation of explosive devices 150 mm (six inches) or greater in height. This does not preclude the placement of site furnishings or plantings around buildings. It only requires conditions such that any explosive devices placed in that space would be observable by building occupants.

**AP1.1.3.1. Electrical and mechanical equipment.** The preferred location of electrical and mechanical equipment such as transformers, air cooled condensers, and packaged chillers is outside the unobstructed space or on the roof, but this standard does not preclude placement within the unobstructed space as long the equipment provides no opportunity for concealment of explosive devices.

**AP1.3.1.2. Equipment enclosures.** If walls or other screening devices with more than two sides are placed around electrical or mechanical equipment within the unobstructed space, the equipment will be enclosed on all four sides and the top. Openings in screening materials and gaps between the ground and screens or walls making up an enclosure will not be greater than 150 mm (six inches). Any surfaces of the enclosures that can be opened will be secured so that unauthorized personnel cannot gain access through them.

**AP1.1.4. Standard 4. Drive-up / drop-off and access roads.** Some facilities require access to areas within the required standoff distance for dropping off or picking up people or loading or unloading packages and other objects. Examples that may require drive-up / drop off include, but are not limited to, medical facilities, exchanges and commissaries, child care centers, and schools.

**AP1.1.4.1. Marking.** Where operational or safety considerations require drive-up or drop-off areas, drive through lanes, or other access roads near buildings, ensure those areas or lanes are clearly defined and marked and that their intended use is clear to prevent parking of vehicles in those areas.

**AP1.1.4.2. Unattended vehicles.** Do not allow unattended vehicles in drive-up or drop-off areas or drive through lanes.

**AP1.1.4.3. Access control.** Ensure that access control measures are implemented to prohibit unauthorized vehicles from using access roads within the applicable standoff distances in Table AP1.1.

**AP1.1.4.4. Location.** Do not allow drive-up / drop-off, drive through lanes, or other access roads to be located under any inhabited portion of a building.

**AP1.1.5. Standard 5. Parking beneath buildings.** Eliminate parking beneath buildings. Where very limited real estate makes parking beneath buildings unavoidable, the following measures must be incorporated into the design for new buildings or mitigating measures must be incorporated into existing buildings to achieve an equivalent level of protection.

**AP1.1.5.1. Access control.** Ensure that personnel and vehicle access at personnel and vehicle entrances to parking areas is physically controlled.

**AP1.1.5.2. Floors.** Ensure that the floors beneath inhabited areas will not breach from the detonation in the parking area of an explosive equivalent to explosive weight II in Table AP 1.1.

**AP1.1.5.3. Superstructure.** All structural elements within and adjacent to the parking area will be subject to the progressive collapse provisions of Standard 6, including the provision for loss of lateral support for vertical load carrying elements.

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**Table AP1.1 Minimum Standoff Distances and Building Separations  
For New and Existing Construction**

Location	Building Category	Standoff Distance or Separation Requirements			
		Applicable Level of Protection	Conventional Construction without Analysis	Conventional Construction with Analysis <sup>(1)</sup>	<sup>(2)</sup>
Controlled Perimeter or Parking and Roadways without a Controlled Perimeter	Billeting	Low	45 m (148 ft.)	25 m (82 ft.)	
	Primary Gathering Building	Low	45 m (148 ft.)	25 m (82 ft.)	
	Inhabited Building	Very Low	25 m (82 ft.)	10 m (33 ft.)	
Parking and Roadways within a Controlled Perimeter	Billeting	Low	25 m (82 ft.)	10 m (33 ft.)	
	Primary Gathering Building	Low	25 m (82 ft.)	10 m (33 ft.)	
	Inhabited Building	Very Low	10 m (33 ft.)	10 m (33 ft.)	
Trash containers	Billeting	Low	25 m (82 ft.)	10 m (33 ft.)	
	Primary Gathering Building	Low	25 m (82 ft.)	10 m (33 ft.)	
	Inhabited Building	Very Low	10 m (33 ft.)	10 m (33 ft.)	
Building Separation	Billeting	Low	10 m (33 ft.)	No antiterrorism minimum	
	Primary Gathering Building	Low	10 m (33 ft.)	No antiterrorism minimum	
	Inhabited Building	Very Low	No antiterrorism minimum	No antiterrorism minimum	Not applicable

1. Standoff distances less than those in this column are not allowed even with analysis.
2. For Official Use Only (FOUO) in this column was deleted.
3. Not Used.

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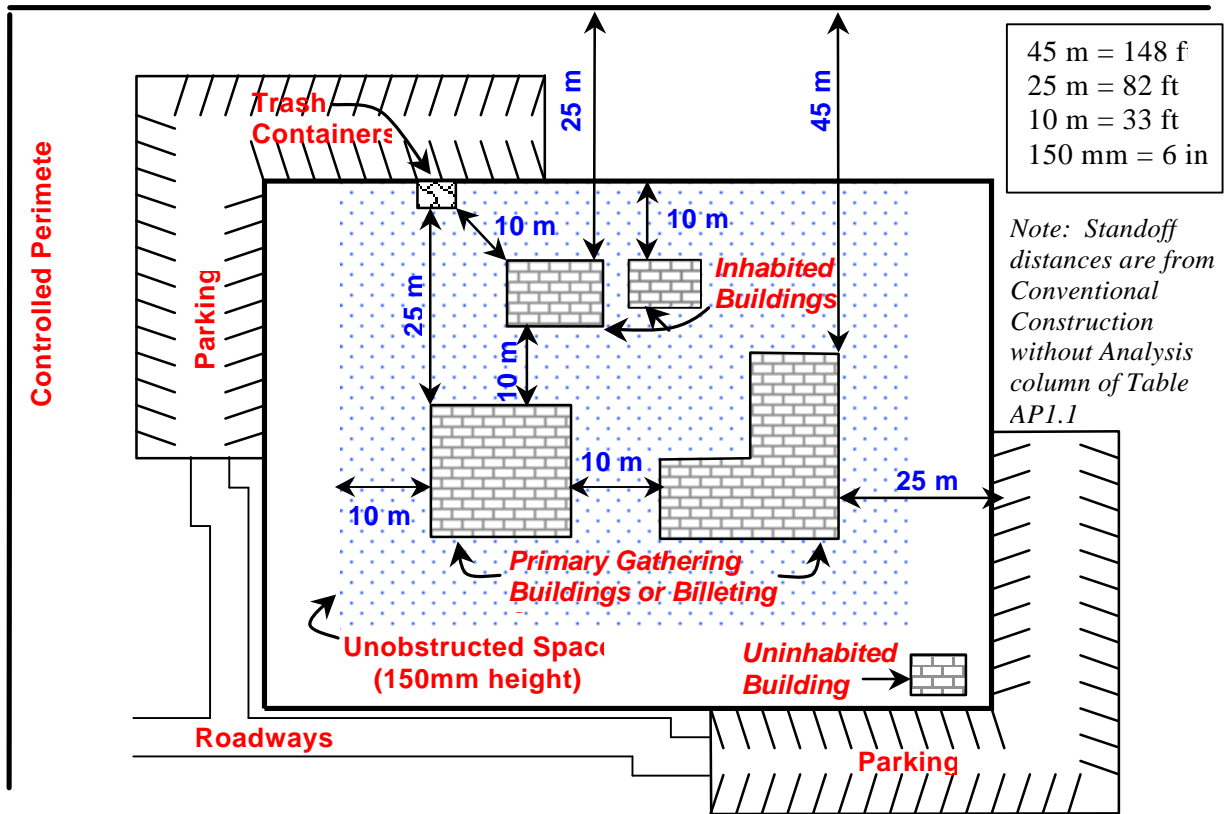
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Figure AP1.1. Standoff Distances and Building Separations - Controlled Perimeter

1

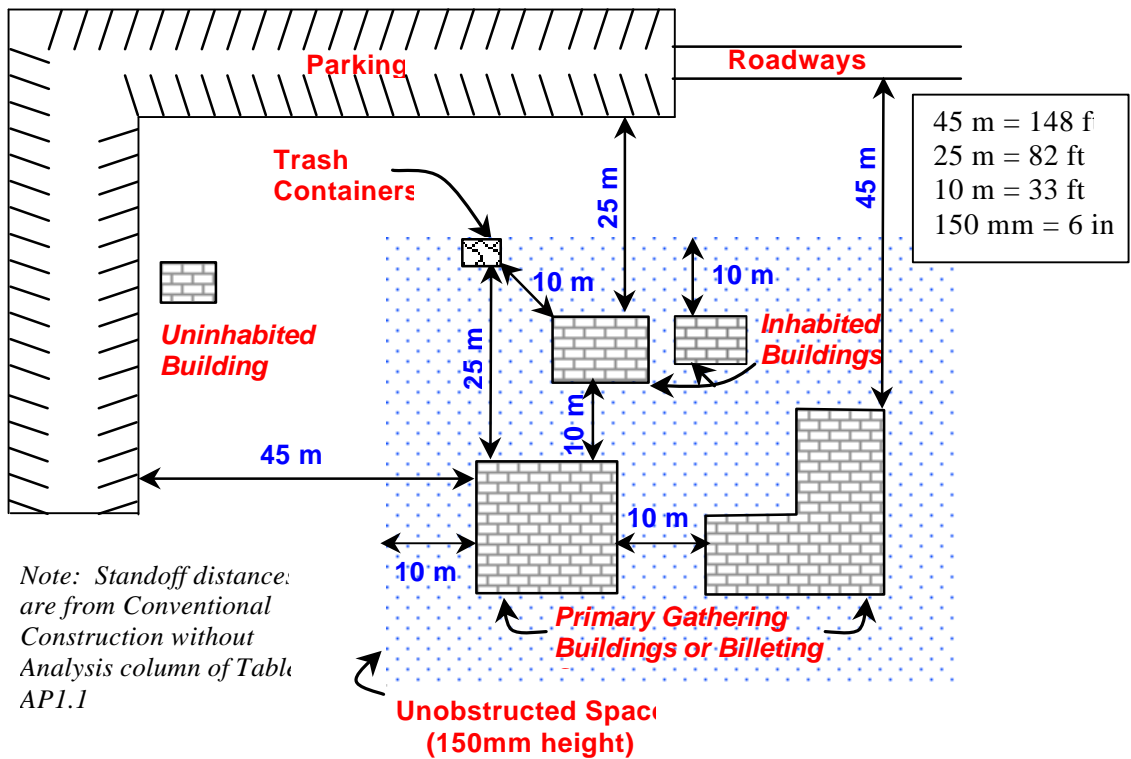


Figure AP1.2. Standoff Distances and Building Separations - No Controlled Perimeter

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**AP1.2. STRUCTURAL DESIGN.** If the minimum standoff distances are achieved, conventional construction should minimize the risk of mass casualties from a terrorist attack. Even if those standoff distances can be achieved, however, there are some additional structural issues that must be incorporated into building designs to ensure that buildings do not experience progressive collapse.

**AP1.2.1. Standard 6. Progressive collapse avoidance.** Progressive collapse is considered to be a significant risk for buildings of three stories (not including basement stories) or more. For all new and existing inhabited buildings of three stories or more, design the superstructure to sustain local damage with the structural system as a whole remaining stable and not being damaged to an extent disproportionate to the original local damage. This shall be achieved through an arrangement of the structural elements that provides stability to the entire structural system by transferring loads from any locally damaged region to adjacent regions capable of resisting those loads without collapse. This shall be accomplished by providing sufficient continuity, redundancy, or energy dissipating capacity (ductility), or a combination thereof, in the members and connections of the structure. For further guidance, refer to American Society of Civil Engineers Standard 7-98 and to detailed guidance in the DoD Security Engineering Manual. In addition, the measures below apply.

**AP1.2.1.1. Exterior columns and walls.** Design all exterior vertical load-carrying elements to sustain a loss of lateral support at any of the floor levels by adding one story height to the nominal unsupported length. This standard is based on the assumption of an external threat. If an internal threat is postulated, this provision will also apply for internal vertical load carrying elements.

**AP1.2.1.2. Exterior member removal.** Analyze the structure to ensure it can withstand removal of one primary vertical or horizontal load-carrying element (i.e. a column or a beam) without progressive collapse.

**AP1.2.1.3. Floors.** Design all floors with improved capacity to withstand load reversals by designing them to withstand a net uplift equal to the dead load plus one-half the live load.

**AP1.2.2. Standard 7. Structural isolation.** Where there are areas of buildings that do not meet the criteria for inhabited buildings, design the superstructures of those areas to be structurally independent from the inhabited area. This will minimize the possibility that collapse of the uninhabited areas of the building will affect the stability of the superstructure of the inhabited portion of the building. Alternatively, verify through analysis that collapse of uninhabited portions of the building will not result in collapse of any portion of the building covered by this standard. This standard is not mandatory for existing structures, but it should be implemented where possible.

**AP1.2.3. Standard 8. Building overhangs.** Avoid building overhangs with inhabited spaces above them where people could gain access to the area underneath the overhang. Where such overhangs must be used, the following measures must be incorporated into the design for new buildings or mitigating measures must be incorporated into existing buildings to achieve an equivalent level of protection.

**AP1.2.3.1. Access control.** Ensure that there are no roadways or parking areas under overhangs.

**AP1.2.3.2. Floors.** Ensure that the floors beneath inhabited areas will not breach from the detonation underneath the overhang of an explosive equivalent to explosive weight II in Table AP1.1.

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**AP1.2.3.3. Superstructure.** All structural elements within and adjacent to the overhang will be subject to the progressive collapse provisions of Standard 6, including the provision for loss of lateral support for vertical load carrying elements.

**AP1.2.4. Standard 9. Exterior masonry walls.** Unreinforced masonry walls are prohibited for the exterior walls of new buildings. A minimum of 0.05 percent vertical reinforcement with a maximum spacing of 1200 mm (48 in) will be provided. For existing buildings, implement mitigating measures to provide an equivalent level of protection.

**AP1.3. ARCHITECTURAL DESIGN.** There are many aspects of building layout and other architectural design issues that improve overall protection of people inside buildings with little added cost.

**AP1.3.1. Standard 10. Windows and glazed doors.** To minimize hazards from flying glass fragments, apply the provisions for glazing and window frames below for all new and existing inhabited buildings covered by these standards. Windows and frames must work as a system to ensure that their hazard mitigation is effective. These provisions apply even if the minimum standoff distances are met.

**AP1.3.1.1. Glazing.** Use a minimum of 6-mm (1/4-in) nominal laminated glass for all exterior windows and glazed doors. The 6-mm (1/4-in) laminated glass consists of two nominal 3-mm (1/8-in) glass panes bonded together with a minimum of a 0.75-mm (0.030-inch) polyvinyl-butyl (PVB) interlayer. For insulated glass units, as a minimum the inner pane must be 6-mm laminated glass. For alternatives to the 6mm (1/4-in) laminated glass that meet required levels of protection, refer to the DoD Security Engineering Manual.

**AP1.3.1.2. Window frames.** Provide frames and mullions of aluminum or steel. Frames, mullions, and window hardware shall be designed to resist a static load of 7 kilopascals (1 lb per square in) applied to the surface of the glazing. Frame and mullion deformations shall not exceed 1/160 of the unsupported member lengths. The glazing shall have a minimum frame bite of 9.5-mm (3/8-in) for structural glazed window systems and 25-mm (1-in) for window systems that are not structurally glazed. Frame connections to surrounding walls shall be designed to resist a combined loading consisting of a tension force of 36-kg/cm (200-lbs/in) and a shear force of 13.5-kg/cm (75 lbs/in). Alternatively, use frames that provide an equivalent level of performance.

**AP1.3.1.3. Mitigation.** Where the minimum standoff distances cannot be met, provide glazing and frames that will provide an equivalent level of protection to that provided by the glazing above as described in Tables C2.1 and C2.2 for the applicable explosive weight in Table AP1.1.

**AP1.3.1.4. Window replacement projects.** Whenever window or door glazing is being replaced in existing inhabited buildings as part of a planned window or glazing replacement, whether or not the building meets the triggers in paragraph C1.5.2, install glazing that meets the requirements above.

**AP1.3.2. Standard 11. Building entrance layout.** The areas outside of installations are commonly not under the direct control of the installations. Where the main entrances to buildings face installation perimeters, people entering and exiting the buildings are vulnerable to being fired upon from vantage points outside the installations. To mitigate those vulnerabilities apply the following measures:

**AP1.3.2.1. New buildings.** For new inhabited buildings, ensure that the main entrance to the building does not face an installation perimeter or other uncontrolled vantage points with direct lines of sight to the entrance.



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**AP1.3.2.2. Existing buildings.** For existing inhabited buildings where the main entrance faces an installation perimeter either use a different entrance as the main entrance or screen that entrance to limit the ability of potential aggressors to target people entering and leaving the building.

**AP1.3.3. Standard 12. Exterior doors.** For all new and existing buildings covered by these standards, ensure that all exterior doors into inhabited areas open outwards. By doing so the doors will seat into the door frames in response to an explosive blast, increasing the likelihood that the doors will not enter the buildings as hazardous debris.

**AP1.3.4. Standard 13. Mailrooms.** The following measures address the location of rooms to which mail is delivered or in which mail is handled in new and existing inhabited buildings. The measures involve limiting collateral damage and injuries and facilitating future upgrades to enhance protection should they become necessary.

**AP1.3.4.1. Location.** Where a new or existing building covered by these standards must have a mailroom, that mailroom will be on the perimeter of the building. By locating the mailroom on the building perimeter there is an opportunity to modify it in the future if a mail bomb threat is identified. Where mailrooms are located in the interior of buildings, few retrofit options are available for mitigating the mail bomb threat.

**AP1.3.4.2. Proximity.** Mailrooms should also be located as far from heavily populated areas of the building and critical infrastructure as possible. This measure will go far toward minimizing injuries and damage if a mail bomb detonates in the mailroom where the mailroom is not specifically designed to resist that threat.

**AP1.3.5. Standard 14. Roof access.** For all new and existing inhabited buildings covered by these standards, control access to roofs to minimize the possibility of aggressors placing explosives or chemical, biological, or radiological agents there or otherwise threatening building occupants or critical infrastructure.

**AP1.3.5.1. New buildings.** For new buildings eliminate all external roof access by providing access from internal stairways or ladders, such as in mechanical rooms.

**AP1.3.5.2. Existing buildings.** For existing buildings eliminate external access where possible or secure external ladders or stairways with locked cages or similar mechanisms.

**AP1.3.6. Standard 15. Overhead mounted architectural features.** For all new and existing buildings covered by these standards, ensure that all suspended ceiling systems and other overhead mounted architectural features are mounted to minimize the likelihood that they will fall and injure building occupants. All such systems will be mounted such that they resist forces of 0.5 times the component weight in any direction and 1.5 times the component weight in the downward direction. This standard does not preclude the need to design architectural feature mountings for forces required by other criteria such as seismic standards.

**AP1.4. ELECTRICAL AND MECHANICAL DESIGN.** Electrical and mechanical design standards address limiting damage to critical infrastructure, protecting building occupants against chemical, biological, and radiological threats, and notification of building occupants of threats or hazards.

**AP1.4.1. Standard 16. Air intakes.** Air intakes to heating, ventilation, and air conditioning (HVAC) systems that are designed to move air throughout a building that are at ground level provide an opportunity for aggressors to easily place contaminants that could be drawn into the building.

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1  
2       **AP1.4.1.1. New buildings.** For all new inhabited buildings covered by this document  
3 locate all air intakes at least 3 meters (10-ft) above the ground.  
4

5       **AP1.4.1.2. Existing buildings.** The above requirement is recommended, but not  
6 mandatory, for existing inhabited buildings covered by these standards.  
7

8       **AP1.4.2. Standard 17. Emergency air distribution shutoff.** For all new and existing  
9 inhabited buildings provide an emergency shutoff switch in the HVAC control system that can  
10 immediately shut down air distribution throughout the building. The switch (or switches) must be located  
11 to be easily accessible by building occupants. Providing such a capability will allow building occupants  
12 to limit the distribution of airborne contaminants that may be introduced into the building.  
13

14       **AP1.4.3. Standard 18. Utility distribution and installation.** Utility systems can suffer  
15 significant damage when subjected to the shock of an explosion. Some of these utilities may be critical to  
16 safely evacuating personnel from the building or their destruction could cause damage that is  
17 disproportionate to other building damage resulting from an explosion. To minimize the possibility of the  
18 above hazards apply the following measures:  
19

20       **AP1.4.3.1. Utility routing.** For all new inhabited buildings route critical or fragile  
21 utilities such that they are not on exterior walls or on walls shared with mailrooms. This requirement is  
22 recommended, but not mandatory, for existing buildings.  
23

24       **AP1.4.3.2. Redundant utilities.** Where redundant utilities are required in accordance  
25 with other requirements or criteria, ensure that the redundant utilities are not collocated or do not run in  
26 the same chases. This minimizes the possibility that both sets of utilities will be adversely affected by a  
27 single event.  
28

29       **AP1.4.4. Standard 19. Equipment bracing.** Mount all overhead utilities and other fixtures to  
30 minimize the likelihood that they will fall and injure building occupants. Design all equipment  
31 mountings to resist forces of 0.5 times the equipment weight in any direction and 1.5 times the equipment  
32 weight in the downward direction. This standard does not preclude the need to design equipment  
33 mountings for forces required by other criteria such as seismic standards.  
34

35       **AP1.4.5. Standard 20. Under building access.** To limit opportunities for aggressors placing  
36 explosives underneath buildings, ensure that access to crawl spaces, utility tunnels, and other means of  
37 under building access is controlled.  
38

39       **AP1.4.6. Standard 21. Mass notification.** All inhabited buildings must have a timely means to  
40 notify occupants of threats and instruct them what to do in response to those threats.  
41

42       **AP1.4.6.1. New buildings.** All new inhabited buildings must have a capability to  
43 provide real-time information to building occupants or personnel in the immediate vicinity of the building  
44 during emergency situations. The information relayed must be specific enough to discriminate  
45 appropriate response actions. Any system, procedure, or combination thereof that provides this capability  
46 will be acceptable under this standard.  
47

48       **AP1.4.6.2. Existing buildings.** For existing buildings the above requirement is  
49 mandatory for primary gathering buildings and billeting, but recommended for all inhabited buildings.  
50

**DRAFT****AP2. APPENDIX 2****RECOMMENDED ADDITIONAL ANTITERRORISM MEASURES  
FOR NEW AND EXISTING BUILDINGS**

**AP2.1. SITE PLANNING.** The following additional measures, if implemented, will significantly enhance site security with little increase in cost and should be considered for all new and existing inhabited buildings.

**AP2.1.1. Recommendation 1. Vehicle access points.** The first line of defense in limiting opportunities for aggressors to get vehicles close to DoD buildings is at vehicle access points at the controlled perimeter, to parking areas, and at drive-up / drop-offs points. Keep the number of access points to the minimum necessary for operational or life safety purposes. That will limit the number of points at which access may have to be controlled with barriers and/or personnel in increased threat environments or if the threat increases in the future.

**AP2.1.2. Recommendation 2. High speed vehicle approaches.** The energy of a moving vehicle increases with the square of its velocity; therefore; minimizing a vehicle's speed allows vehicle barriers to be lighter and less expensive should vehicle barriers ever become necessary. To facilitate reductions in vehicle speeds in the future, ensure there are no unobstructed vehicle approaches perpendicular to perimeters at the required parking and roadway standoff distances.

**AP2.1.3. Recommendation 3. Vantage points.** Vantage points are natural or man-made positions from which potential aggressors can observe and target people or other assets in and around a building. Identify vantage points outside the control of personnel in the targeted building and either eliminate them or provide means to avoid exposure to them. Means to avoid exposure may include actions such as reorienting the building or shielding people or assets in and around the building using such measures as reflective glazing, walls, privacy fencing, or vegetation.

**AP2.1.4. Recommendation 4. Drive-up / drop off.** Locate these points away from large glazed areas of the building to minimize the potential for hazardous flying glass fragments in the event of an explosion. For example, the lane may be located at an outside corner of the building or otherwise away from the main entrance. The drive-up/drop-off point should be coordinated with the building geometry to minimize the possibility that explosive blast forces could be increased due to being trapped or otherwise concentrated. For further discussion of this issue refer to the DoD Security Engineering Manual.

**AP2.1.5. Recommendation 5. Building location.** Activities with large visitor populations provide opportunities for potential aggressors to get near buildings with minimal controls and therefore limit opportunities for early detection. Maximize separation distance between inhabited buildings and areas with large non-DoD visitor populations.

**AP2.1.6. Recommendation 6. Railroad location.** Avoid sites for inhabited buildings that are close to railroads. Where railroads are in the vicinity of existing buildings, standoff distances between the railroad and any inhabited buildings should be provided based on the standoff distances and explosive weight associated with controlled perimeters in Table AP1.1. Where those standoff distances are not available and since moving existing railroads may be difficult and prohibitively expensive, ensure that there are procedures in place to prohibit trains from stopping in the vicinity of inhabited structures.

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1       **AP2.1.7. Recommendation 7. Entry control points for family housing.** For new family  
2 housing areas, provide space for an entry control point at the perimeter of the housing area so that a  
3 controlled perimeter can be established there if the need arises in the future.  
4

5       **AP2.2. ARCHITECTURAL DESIGN.** The following additional measures, if implemented, will  
6 significantly enhance building occupants' safety and security with little increase in cost and should be  
7 considered for all new and existing inhabited buildings.  
8

9       **AP2.2.1. Recommendation 8. Internal circulation.** Design circulation within buildings to  
10 provide visual detection and monitoring of unauthorized personnel approaching controlled areas or  
11 occupied spaces.  
12

13       **AP2.2.2. Recommendation 9. Visitor control.** Controlling visitor access points maximizes the  
14 possibility of detecting potential threatening activities. Keep visitor control points in buildings away from  
15 sensitive or critical areas, areas where high risk or mission critical personnel are located, or other areas  
16 with large population densities of DoD personnel.  
17

18       **AP2.2.3. Recommendation 10. Asset location.** To minimize exposure to direct blast effects  
19 and potential impacts from hazardous glass fragments and other potential debris, locate critical assets and  
20 mission critical or high risk personnel away from the building exterior.  
21

22       **AP2.2.4. Recommendation 11. Room layout.** In rooms adjacent to the exterior of the building  
23 position personnel and critical equipment to minimize exposure to direct blast effects and potential  
24 impacts from hazardous glass fragments and other potential debris.  
25

26       **AP2.2.5. Recommendation 12. External hallways.** Because doors can become hazardous  
27 debris during explosive blast events, because doors designed to resist blast effects are expensive, and  
28 because external hallways have large numbers of doors leading into inhabited areas, avoid exterior  
29 hallway configurations for inhabited structures.  
30

31       **AP2.2.6. Recommendation 13. Windows.** To minimize the potential for glazing hazards,  
32 minimize the size and number of windows for new construction.  
33

34       **AP2.2.7. Recommendation 14. Minimize secondary debris.** Eliminate unvetted concrete  
35 barriers and site furnishings in the vicinity of inhabited structures that are accessible to vehicle traffic.  
36 Revet exposed concrete surfaces with 1 meter (3 feet) of soil to prevent fragmentation hazards in the  
37 event of an explosion.

**DRAFT****AP3. APPENDIX 3****DoD Construction Standards for Expeditionary and Temporary Structures**

**AP3.1. STANDARDS.** All the standards that are unique to expeditionary and temporary structures pertain to site planning. Operational, logistic, and security requirements must be integrated in the overall configuration of structures, equipment, landscaping, parking, roads, and other features. The most cost-effective solution to mitigating explosive effects on expeditionary and temporary structures is to keep explosives as far away as possible. This is especially critical for these types of structures because hardening may or may not be possible. Costs and requirements for expeditionary and temporary structure hardening are addressed in the DoD Security Engineering Manual.

**AP3.1.1. Standard 1. Minimum Standoff Distances.** The minimum standoff distances apply to all new and existing DoD expeditionary and temporary structures covered by these standards except as otherwise stated below. The minimum standoff distances are presented in Table AP3.1. Except as otherwise required in these standards, where the standoff distances in Table AP3.1 can be provided, conventional expeditionary and temporary structures may be used without a specific analysis of blast effects. Where those distances are not available, the structure must be analyzed and hardened as necessary (in those cases which permit structure hardening) to mitigate the effects of the explosives indicated in Table AP1.1 at the achievable standoff distance to the appropriate level of protection. The appropriate levels of protection for each structure category are shown in Table AP3.1 and are described in Table C2.3 and in the DoD Security Engineering Manual. The two structure types in Table AP3.1. respond in fundamentally different ways to explosive effects. Standoff distances in Table AP3.1 reflect those differences.

**AP3.1.1.1. Controlled perimeter.** The standoff distance will be measured from the closest point on the structure exterior to the controlled perimeter.

**AP3.1.1.1.1. Fabric covered/metal frame construction and wood frame/rigid wall structures.** Provide the standoff distance from Table AP3.1 for the applicable structure category.

**AP3.1.1.1.2. Container structures.** For these structures, apply the guidance in Appendix AP1.

**AP3.1.1.2. Parking and roadways.** Standoff distances for parking and roadways are based on the assumption that there is a controlled perimeter at which larger vehicle bombs will be detected and kept from entering the controlled perimeter. Where there is a controlled perimeter, the standoff distances and explosive weight associated with parking and roadways in Table AP3.1 apply unless otherwise stated below. If there is no controlled perimeter, it must be assumed that the larger explosive weights upon which the controlled perimeter standoff distances are based (explosive weight I from Table AP3.1.) can access parking and roadways near buildings. Therefore, where there is no controlled perimeter, standoff distances from parking and roadways will be in accordance with the distances and the explosive weight associated with controlled perimeters in Table AP3.1.

**AP3.1.1.2.1. All Fabric covered/metal frame construction and wood frame/rigid wall structures.** The standoff distance will be measured from the closest point on the structure exterior to the closest edge of parking areas and roadways. The minimum standoff for all structures regardless of hardening or analysis will be 10 meters (33 feet).

**AP3.1.1.2.2. Existing Fabric covered/metal frame construction and wood frame/rigid wall structures.** Moving existing parking areas and roadways may be difficult to achieve

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1 and structural retrofits to existing structures may be prohibitively expensive or technically impossible;  
2 therefore, the following operational options are provided for existing inhabited structures where the  
3 standoff distances in Table AP3.1 are impractical to achieve.

4  
5 **AP3.1.1.2.2.1. Parking areas.** Establish entry control to portions of  
6 parking areas to ensure unauthorized vehicles are not allowed closer than the required standoff distance.  
7 For primary gathering structures and billeting if entry control is provided to prevent unauthorized parking  
8 within the required standoff distance, controlled parking may be permitted as close as 10 meters (33 feet)  
9 without hardening or analysis.

10 **AP3.1.1.2.2.2. Roadways.** Eliminate parking within the required  
11 standoff distances along roads adjacent to existing structures covered by these standards.

12  
13 **AP3.1.1.2.3. Container structures.** For these structures, apply the guidance in  
14 Appendix AP1.

15  
16 **AP3.1.1.3. Trash containers.** The standoff distance will be measured from the closest  
17 point on the structure to the nearest point of the trash container or trash container enclosure. As a  
18 mitigating measure where the standoff distance is not available, hardening of trash enclosures to mitigate  
19 the direct blast effects of the explosive and the secondary fragment effects on the structure is acceptable if  
20 the applicable level of protection can be proven by analysis.

21  
22 **AP3.1.1.3.1. Fabric covered/metal frame construction and wood frame/rigid**  
23 **wall construction.** Provide the standoff distance from Table AP3.1 for the applicable structure category.

24  
25 **AP3.1.1.3.2. Container structures.** For these structures, apply the guidance in  
26 Appendix AP1.

27  
28 **AP3.1.2. Standard 2. Structure separation.** Structure separation requirements are established  
29 to minimize the possibility that an attack on one structure causes injuries or fatalities in adjacent  
30 structures. The separation distance is predicated on the potential use of indirect fire weapons.

31  
32 **AP3.1.2.1. Billeting and primary gathering structures.**

33  
34 **AP3.1.2.1.1. Fabric covered/metal frame construction and wood frame/rigid**  
35 **wall construction.** For all new billeting and primary gathering structures ensure that adjacent structures  
36 are separated by at least the distances in Table AP3.1. Where it is necessary to encroach on those  
37 structure separations, analyze the structure and provide hardened structure components as necessary to  
38 mitigate the effects of the explosive indicated in Table AP3.1 to the appropriate level of protection as  
39 shown in Table AP3.1 and described in Table C1.3 and in the DoD Security Engineering Manual.

40  
41 **AP3.1.2.1.2. Container structures.** For these structures, apply the guidance in  
42 Appendix AP1.

43  
44 **AP3.1.2.2. Other inhabited buildings.** There are no minimum separation distances  
45 required for antiterrorism for inhabited buildings.

46  
47 **AP3.1.3. Standard 3. Unobstructed space.** Keep areas within 10 meters (33 feet) of all  
48 expeditionary and temporary structures free of items other than those that are part of the infrastructure.

49  
Table AP3.1 Removed  
FOUO Information was Removed from this Table.

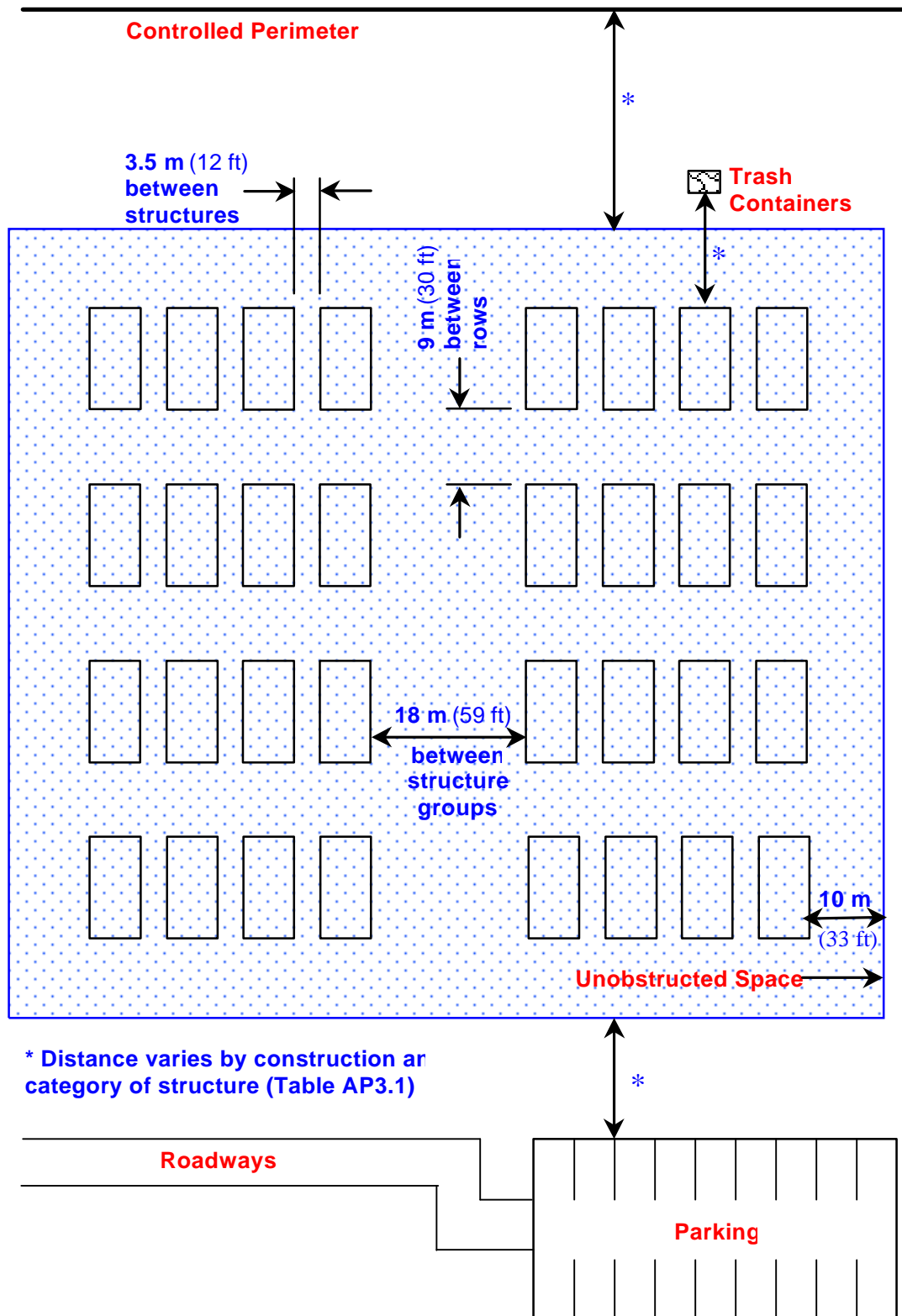
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Figure AP3.1. Standoff Distances and Structure Separation  
Expeditionary Structures

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1       **AP3.1.4. Additional standards.** In addition to the specific standards detailed in this appendix,  
2 standards from Appendix AP1 shall apply to expeditionary and temporary structures as follows:  
3

4       **AP3.1.4.1. Fabric covered/metal frame construction and wood frame/rigid wall**  
5 **construction.** The following standards from Appendix AP1 shall be applied to these structures:  
6

7               **AP3.1.4.1.1. Standard 4. Drive-up/drop off and access roads**  
8

9               **AP3.1.4.1.2. Standard 10. Windows and glazed doors**  
10

11              **AP3.1.4.1.3. Standard 11. Building entrance layout**  
12

13              **AP3.1.4.1.4. Standard 19, Equipment bracing**  
14

15              **AP3.1.4.1.5. Standard 18. Mass notification.**  
16

17       **AP3.1.4.2. Container structures.** For these structures, all standards in  
18 Appendix AP1 apply.  
19

20 **AP3.3. ANTITERRORISM RECOMMENDATIONS.** All recommendations except for  
21 Recommendation 7 (Entry Control Points for Family Housing) from Appendix AP2 should be applied to  
22 expeditionary and temporary structures.



# **ATTACHMENT NO. 11**

## **DRAWINGS (RFP AND SURVEY)**

1. RFP Drawings for the CONTROL TOWER AT USAF ACADEMY, CO are listed below and are included on the CD-ROM with the solicitation requirements in (\*.cals format).

2. ENGINEERING SURVEY: "\_\_\_\_\_ .dwg." survey file (AutoCAD 2002 drawing file) will be furnished by for the CONTROL TOWER, USAF ACADEMY, CO.

D1.01 COVER

D2.01 INDEX

D3.02 LEGEND

D4.03 ELECTRICAL LEGEND

D5.04 ABBREVIATIONS

P1.01 LOCATION PLAN AND VICINITY MAP

P1.02 PROJECT AREA PLAN

P1.03 SURVEY PLAN

P3.01 SITE PLAN

A1.1 FIRST FLOOR PLAN

A1.2 SECOND FLOOR PLAN - SIXTH FLOOR PLAN

A1.03 GATR BUILDING FLOOR PLAN AND ELEVATIONS

A3.1 ROOF PLAN

A4.1 NORTH & WEST ELEVATIONS

A4.2 SOUTH & EAST ELEVATIONS

A5.1 CROSS SECTION

I.1 BUILDING #9212 - CONTROL TOWER FOR INFORMATION ONLY

I.2 BUILDING #9212 - CONTROL TOWER FOR INFORMATION ONLY

I.3 BUILDING #9212 - CONTROL TOWER FOR INFORMATION ONLY

I.4 BUILDING #9212 - CONTROL TOWER FOR INFORMATION ONLY

I.5 BUILDING #9229 - CONTROL TOWER FOR INFORMATION ONLY

I.6 CONTROL TOWER CAB DETAILS FOR INFORMATION ONLY

I.7 CONTROL TOWER CAB DETAILS FOR INFORMATION ONLY

I.8 CONTROL TOWER CAB DETAILS FOR INFORMATION ONLY

I.9 CONTROL TOWER CAB DETAILS FOR INFORMATION ONLY

I.10 CONTROL TOWER CAB DETAILS FOR INFORMATION ONLY

G1.01 SOIL BORING LOGS AND LOCATION MAP

E1 INSTALL DUAL FEEDERS, AIRFIELD (PHASE 1) NEW SITE PLAN

E3 INSTALL DUAL FEEDERS, AIRFIELD (PHASE 1) RSU AREA PLAN

E4 INSTALL DUAL FEEDERS, AIRFIELD (PHASE 1) SQUAD OPS AREA PLAN

E5 INSTALL DUAL FEEDERS, AIRFIELD (PHASE 1) DETAILS

E6 INSTALL DUAL FEEDERS, AIRFIELD (PHASE 1) DETAILS

E2 INSTALL DUAL FEEDERS, AIRFIELD (PHASE 2) DEMO SITE PLAN

E3 INSTALL DUAL FEEDERS, AIRFIELD (PHASE 2) NEW SITE PLAN

E5 INSTALL DUAL FEEDERS, AIRFIELD (PHASE 2) RSU AREA PLAN

E6 INSTALL DUAL FEEDERS, AIRFIELD (PHASE 2) SQUAD OPS AREA PLAN

E7 INSTALL DUAL FEEDERS, AIRFIELD (PHASE 2) NEW ONE-LINE DIAGRAM

E8 INSTALL DUAL FEEDERS, AIRFIELD (PHASE 2) MANHOLE DETAILS

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